

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Tomas LEON et al.

Serial No.: 09/550,752

Filed: 04/17/2000

For: INVESTMENT MANAGEMENT

Group Art Unit: 3691

Examiner: Hamilton, Lalita M.

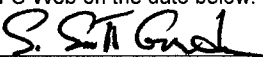
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March 1, 2010
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S. Scott Gordon

APPEAL BRIEF

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant submits this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final Office Action dated October 2, 2009. Appellant filed the Notice of Appeal on December 31, 2009; therefore, the deadline for filing this Appeal Brief is February 28, 2010; however, pursuant to 37 C.F.R. § 1.7, this Appeal Brief is timely submitted on March 1, 2010.

The small entity filing fee for the Appeal Brief is being paid concurrently herewith through EFS-Web. It is believed that no other fees under 37 C.F.R. §§ 1.16 to 1.21 are occasioned by the filing of this paper; however, should the Commissioner determine otherwise, the Commissioner is hereby authorized to deduct said fees from Fulbright & Jaworski Deposit Account No. 50-1212/TTHC:003US/10013416.

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I. REAL PARTY IN INTEREST

The real party in interest is Trans Texas Holdings Corp.

II. RELATED APPEALS AND INTERFERENCES

There was a previous appeal (Appeal No. 2009-001227) involving claims 34-41, which was decided June 4, 2009.

There were two previous decisions on appeal in related Reexam Serial Numbers 90/005,841 and 90/005,842 that were decided May 26, 2006, the Appeal Serial Numbers of which are 2005-2642 and 2005-2643, respectively. The Board decisions on these appeals were appealed to the Federal Circuit as Federal Circuit case numbers are 2006-1599 and 2006-1600, respectively. The Federal Circuit consolidated these appeals and issued a decision that is reported at 498 F.3d 1290 (Fed. Cir. 2007).

III. STATUS OF THE CLAIMS

Claims 1-33 and 42-45 have been canceled. Claims 34-41 and 46-61 are pending and are rejected. The rejection of claims 34-41 and 46-61 is being appealed.

IV. STATUS OF AMENDMENTS

Appellant filed amendments after final rejection to claims 46-53 on December 2, 2009. The amendments were not entered by the Examiner.

V. SUMMARY OF CLAIMED SUBJECT MATTER¹

Independent claim 34 is directed to an electronic inflation-adjusted financial instrument stored in a data storage device. (See Fig. 1; *specification*, pg. 10, ll. 1-2 [describing Deposit Funds Available Data File 16 (“DFADF”)], and ll. 20-21 [describing Loan Funds Desired Data File 20 (“LFDDF”)]). The claim also recites a principal component stored in a data storage device, the principal component being periodically adjusted for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component (Figs. 1-2; *specification*, pg. 11, ll. 12-26; pg. 13, ll. 4-36). An accrual component stored in a data storage device is also included, the accrual component including an interest rate fixed for a term of the financial instrument. (Figs. 1-2; *specification*, pg. 10, ll. 13-15; pg. 11, ll. 12-26; pg. 12, ll. 7-20). The periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid. (Figs. 1-2; *specification*, pg. 11, ll. 22-36; pg. 15, ll. 1-19). The inflation-adjusted principal component is payable at the end of the term. (Figs. 1-2; *specification*, pg. 11, ll. 22-36; pg. 15, ll. 1-19).

Independent claim 38 is directed to an electronic inflation-adjusted financial instrument stored in a data storage device (FIG. 1; *specification*, pg. 10, ll. 1-6, 20-

¹ Parentheticals citing to support in the specification for the claim language are exemplary and not meant to indicate that the specific citations are the only support in the specification for the claim language.

25; pg. 14 ll. 5-9; pg. 20 ll. 4-6). The instrument includes a principal component stored in a data storage device. (Figs. 1-2; *specification*, pg. 11, ll. 12-26; pg. 13, ll. 4-36). The instrument also includes an accrual component stored in a data storage device, where the accrual component has fixed and variable interest components payable periodically. (Figs. 1-2; *specification*, pg. 11, ll. 12-26; pg. 13, ll. 4-36). Additionally, the variable interest component of the instrument is adjusted for inflation based on the Consumer Price Index (CPI). (Figs. 1-2; *specification*, pg. 11, ll. 12-26; pg. 13, ll. 4-36). The principal component of the instrument is payable at the end of a term of the financial instrument. (Figs. 1-2; *specification*, pg. 11, ll. 22-36; pg. 15, ll. 1-19).

Independent claims 46 and 50 are directed to a dataprocessor 8 suitably configured to perform the functions described above. (Fig. 1; *specification*, pg. 12, ll. 7-9). Similarly, independent claims 54 and 58 are directed to methods for adjusting a financial instrument for inflation that include certain functions performed by a dataprocessor 8. (Figs 1-4; *specification* pg. 12, ll. 7-9).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 46-53 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter of the invention.

Claims 34-41 and 46-61 stand rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter.

VII. ARGUMENT

A. Claims 46-53 Are Not Indefinite

Claims 46-53 were rejected under 35 U.S.C. § 112, second paragraph as allegedly failing to particularly point out and distinctly claim the subject matter of the invention. Appellant respectfully disagrees.

Claim 46 is representative, and recites:

46. A dataprocessor suitably configured to:

periodically adjust a principal component of a financial instrument for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

compute an accrual component of said financial instrument, said accrual component including an interest rate fixed for a term of the financial instrument;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

Claim 46. In rejecting claims 46-53, the Office states, “claims 46 and 50 recite a data processor, but the body of the claim recites only method steps. It is unclear if the claim is directed to a method or an apparatus. The Appellant cannot claim the data processor with limitations directed solely to a method or process steps.” Final

Office Action at p. 2. However, there is no question that the claim is directed to an apparatus because the preamble is unequivocal: “A dataprocessor suitably configured to[.]” The Office’s issue with the manner in which the claimed apparatus is defined—through functional limitations—is legally unfounded.

It has long been the law that structures may be defined in terms of the functions they are configured to perform. *See In re Swinehart*, 439 F.2d at 212 (“In our view, there is nothing intrinsically wrong with the use of [functional language] in drafting patent claims.”); *In re Venezia*, 530 F.2d 956, 959 (CCPA 1976) (holding that a claim reciting the language “may be slideably positioned” was definite and explaining that the language “**limits the structure** of the housing to those configurations which allow for the completed connector assembly desired”) (emphasis added). The use of “configured to” to introduce functional limitations is also appropriate. *See Ex parte Boudry*, Appeal No. 2000-1978, slip op. at 6-7 (B.P.A.I. Aug. 21, 2001) (non-binding). Accordingly, the claim is definite and the rejection must be reversed.

Moreover, to the extent the Office was trying to apply the Federal Circuit’s holding in *IPXL*, it failed. In *IPXL*, the court determined that an apparatus claim that included a method step for using that apparatus was indefinite. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005). In

particular, the court was considering the following language from dependent claim 25:

The system of claim 2 [including an input means] wherein the predicted transaction information comprises both a transaction type and transaction parameters associated with that transaction type, and the user uses the input means to either change the predicted transaction information or accept the displayed transaction type and transaction parameters.

Id. (emphasis added by court). The court held that claim 25 recited both the system of claim 2 and a method for using that system and concluded, “[t]hus, it is unclear whether infringement of claim 25 occurs when one creates a system that allows the user to change the predicted transaction information or accept the displayed transaction, or whether infringement occurs when the user actually uses the input means to change transaction information or uses the input means to accept a display transaction.” *Id.* By contrast, claims 46-53 of the present application contain no such ambiguity because the rejected claims do not include a method for using the dataprocessor.

For at least these additional reasons, the rejection of claims 46-53 must be reversed.

B. Claims 34-41 and 46-61 Are Directed to Statutory Subject Matter

Claims 34-41 and 46-61 were rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Appellant respectfully disagrees.

1. Claims 34-41 are Directed to Statutory Subject Matter

Claims 34-41 are directed to statutory subject matter because they are directed to a data storage device, which is statutory subject matter under 35 U.S.C. § 101 because it is tangible. Claim 34 is representative, and recites:

34. An electronic inflation-adjusted financial instrument stored in a data storage device comprising:

a principal component stored in a data storage device, the principal component being periodically adjusted for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

an accrual component stored in a data storage device, the accrual component including an interest rate fixed for a term of the financial instrument;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

Claim 34.

By its terms, claim 34 requires a physical data storage device. Nothing in the specification suggests that the claimed “data storage device” reads on non-statutory subject matter, nor has the Office suggested otherwise. As a result, it is a patent-eligible “manufacture.” *See Ex parte Mazarra*, Appeal No. 2008-4741, slip op. at 20 (B.P.A.I. Feb. 5, 2010) (non-binding) (finding physical computer readable media qualifies as a manufacture under *Diamond v. Chakrabarty*, 447

U.S. 303, 308 (1980)). The presence of descriptive material stored on the device—the claimed components—does not alter its status under Section 101. *In re Warmerdam*, 33 F.3d 1354, 1360-61 (Fed. Cir. 1994) (holding claim directed to machine having a memory containing certain data was statutory). Rather, such descriptive material bears only on the patentability analysis under Sections 102 and/or 103 (not Section 101), as explained in the August 24, 2009 *Interim Guidelines*:

- The functional/non-functional distinction is not an inquiry under 101. The 101 inquiry is whether a claim directed to one of the four statutory categories is wholly directed to a judicial exception.
- A tangible medium including a computer program should be evaluated to determine if there is a functional relationship between the computer program and the medium for purposes of distinguishing over prior art, not for subject matter eligibility.

Interim Examination Instructions For Evaluating Subject Matter Eligibility Under 35 U.S.C. § 101 (August 24, 2009) at slide 11²; *see also id.* at p. 4 section II.A.(c) (explaining that stored data is evaluated for prior art purposes, not statutory subject matter eligibility). For at least these reasons, the statutory subject matter rejection of claims 34-41 should be reversed.

² The *Interim Guidelines* are at http://www.uspto.gov/patents/law/comments/2009-08-25_interim_101_instructions.pdf.

2. Claims 46-53 are Directed to Statutory Subject Matter

Claims 46-53 are directed to statutory subject matter because the claimed dataprocessor qualifies as a machine and/or manufacture under Section 101. Claim 46 is representative, and recites:

46. A dataprocessor suitably configured to:

periodically adjust a principal component of a financial instrument for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

compute an accrual component of said financial instrument, said accrual component including an interest rate fixed for a term of the financial instrument;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

Claim 46.

The Office admits that claim 46 is “directed to a data processor,” but states that the claim is non-statutory because “there are no structural elements cited in the body of [the] claim.” Final Office Action at p. 3. The Office’s analysis fails.

It is undisputed that a dataprocessor is a machine and/or a manufacture that is patent-eligible under Section 101. *See In re Ferguson*, 558 F.3d 1359, 1364 (defining “machine”). Furthermore, and as explained above, it is also entirely appropriate to define a structure in terms of its function. *See In re Swinehart*, 439

F.2d at 212 (“In our view, there is nothing intrinsically wrong with the use of [functional language] in drafting patent claims.”); *In re Venezia*, 530 F.2d at 959 (holding that a claim reciting the language “may be slideably positioned” was definite and explaining that the language “**limits the structure** of the housing to those configurations which allow for the completed connector assembly desired”) (emphasis added). Moreover, the use of “configured to” to introduce functional limitations is also appropriate. *See Ex parte Boudry*, slip op. at 6-7. Accordingly, claims 46-53 are directed to a machine that is properly defined in functional terms, and the rejection should be reversed.

Furthermore, Example claim 2 of the *Interim Guidelines* shows why claims 46-53 are patent-eligible. Example claim 2 recites:

- Claim 2. A machine for evaluating search results, comprising:
- a microprocessor coupled to a memory,
 - wherein the microprocessor is programmed to evaluate search results by:
 - sorting the results into groups based on a first characteristic;
 - ranking the results based on a second characteristic using a mathematical formula [f]; and
 - comparing the ranked results to a predetermined list of desired results to evaluate the success of the search.

Interim Guidelines, at slide 9. Just like the claimed dataprocessor, the microprocessor in Example claim 2 is defined by the functions it is programmed to

perform. The Office's determination that Example claim 2 is statutory despite the functionally-defined microprocessor applies with equal force here.

3. Claims 54-61 are Directed to Statutory Subject Matter

Claims 54-61 are directed to statutory subject matter because they are tied to a particular machine, and therefore satisfy *Bilski*'s machine-or-transformation test.

Representative claim 54 recites:

54. A method for adjusting a financial instrument for inflation comprising:

periodically adjusting a principal component of said financial instrument for inflation, the periodically adjusting performed by a dataprocessor based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

computing an accrual component of said financial instrument, said accrual component including an interest rate fixed for a term of the financial instrument, said computing performed by the dataprocessor;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

Claim 54 (emphasis added).

The Office states that "Applicant's method steps are not tied to a particular machine and do not perform a transformation. Thus, the claims are non-statutory."

Final Action at p. 3. The Office fails to address that the claimed "periodically

adjusting” and the claimed “computing” are performed by a dataprocessor. This failure alone merits reversal because the Office has not established a *prima facie* Section 101 rejection. *See Ex parte Masaoka*, Appeal No. 2007-4221, slip op. at 9-10 (B.P.A.I. May 20, 2008) (non-binding) (failure to address limitation in making obviousness rejection merited reversal).

Moreover, the claim is statutory because the claimed dataprocessor is a particular machine to which the claimed periodically adjusting and computing are tied. The claimed dataprocessor is a meaningful limitation on the scope of the claim because other structures for performing the claimed steps could have been claimed instead, *see Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972) (holding that the claimed digital computer did not limit the claimed “mathematical formula” because the formula had “no substantial practical application *except* in connection with a digital computer”) (emphasis added), and its involvement represents more than insignificant extra-solution activity because it performs both the periodically adjusting and the computing. Accordingly, claim 54 is a statutory process, and the rejection should be reversed.

Furthermore, Example claim 5 of the *Interim Guidelines* shows why claims 54-61 are patent-eligible. Example claim 5 recites:

Claim 5. A method of evaluating search results, comprising:
– sorting the results into groups based on a first characteristic;

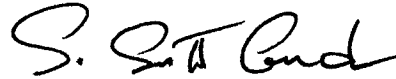
- ranking the results based on a second characteristic; and
- comparing, using a microprocessor, the ranked results to a predetermined list of desired results to evaluate the success of the search.

Interim Guidelines, at slide 15. As the Office explains in *Interim Guidelines*, Example claim 5 is directed to statutory subject matter because the claimed comparing step – just like the claimed periodically adjusting and the claimed computing steps – requires a particular machine (the claimed microprocessor), and that machine imposes a meaningful limit and is more than insignificant extra-solution activity. Specifically, the Office states that “the step of comparing is central to the method invented by applicant – it is not a mere field-of-use or insignificant extra-solution activity.” By this same reasoning, claim 54 is statutory.

C. Conclusion

For at least the reasons presented above, the rejections of the appealed claims should be reversed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "S. Scott Gordon". The signature is fluid and cursive, with the first name "S." and last name "Gordon" clearly distinguishable.

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Date: March 1, 2010

VIII. CLAIMS APPENDIX

34. An electronic inflation-adjusted financial instrument stored in a data storage device comprising:

a principal component stored in a data storage device, the principal component being periodically adjusted for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

an accrual component stored in a data storage device, the accrual component including an interest rate fixed for a term of the financial instrument;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

35. The electronic inflation-adjusted financial instrument of claim 34, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

36. The electronic inflation-adjusted financial instrument of claim 34, wherein said financial instrument comprises a debt instrument.

37. The electronic inflation-adjusted financial instrument of claim 36, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

38. An electronic inflation-adjusted financial instrument stored in a data storage device comprising:

a principal component stored in a data storage device;

an accrual component stored in a data storage device, the accrual component having fixed and variable interest components payable periodically, said variable interest component being adjusted for inflation based on the Consumer Price Index (CPI); and

wherein the principal component is payable at the end of a term of the financial instrument.

39. The electronic inflation-adjusted financial instrument of claim 38, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

40. The electronic inflation-adjusted financial instrument of claim 38, wherein said financial instrument comprises a debt instrument.

41. The electronic inflation-adjusted financial instrument of claim 40, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

46. A dataprocessor suitably configured to:

periodically adjust a principal component of a financial instrument for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;

compute an accrual component of said financial instrument, said accrual component including an interest rate fixed for a term of the financial instrument;

wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and

wherein the inflation-adjusted principal component is payable at the end of the term.

47. The dataprocessor of claim 46, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

48. The dataprocessor of claim 46, wherein said financial instrument comprises a debt instrument.

49. The dataprocessor of claim 48, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

50. A dataprocessor suitably configured to:
compute a principal component of a financial instrument;
compute an accrual component of said financial instrument, said accrual component having fixed and variable interest components payable periodically, said variable interest component being adjusted by said dataprocessor for inflation based on the Consumer Price Index (CPI);
and
wherein the principal component is payable at the end of a term of the financial instrument.

51. The dataprocessor of claim 50, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

52. The dataprocessor of claim 50, wherein said financial instrument comprises a debt instrument.

53. The dataprocessor of claim 52, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

54. A method for adjusting a financial instrument for inflation comprising:
periodically adjusting a principal component of said financial instrument for inflation, the periodically adjusting performed by a dataprocessor based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;
computing an accrual component of said financial instrument, said accrual component including an interest rate fixed for a term of the financial instrument, said computing performed by the dataprocessor;
wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and
wherein the inflation-adjusted principal component is payable at the end of the term.

55. The method of claim 54, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

56. The method of claim 54, wherein said financial instrument comprises a debt instrument.

57. The method of claim 56, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

58. A method for adjusting a financial instrument for inflation comprising:
computing a principal component of said financial instrument, said computing performed by a dataprocessor;

computing an accrual component of said financial instrument, said accrual component having fixed and variable interest components payable periodically, said variable interest component being adjusted for inflation based on the Consumer Price Index (CPI), said computing performed by the dataprocessor; and
wherein the principal component is payable at the end of a term of the financial instrument.

59. The method of claim 58, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).

60. The method of claim 58, wherein said financial instrument comprises a debt instrument.

61. The method of claim 60, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

Decision on Appeal 2009-001227, Application No. 09/550,752, June 4, 2009

Decision on Appeal 2005-2642, Reexam No. 90/005,841, May 26, 2006

Decision on Appeal 2005-2643, Reexam No. 90/005,842, May 26, 2006

Judgment, CAFC Case Nos. 2006-1599, -1600, August 22, 2007 (on appeal from USPTO Appeal Nos. 2005-2642, -2643)



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09/550,752	04/17/2000	Tomas Leon	TTHC:003US/ 10013416	1159
32425 7590 06/04/2009 FULBRIGHT & JAWORSKI L.L.P. 600 CONGRESS AVE. SUITE 2400 AUSTIN, TX 78701			EXAMINER HAMILTON, LALITA M	
			ART UNIT 3691	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOMAS LEON and LEWIS J. SPELLMAN

Appeal 2009-001227
Application 09/550,752
Technology Center 3600

Decided:¹ June 4, 2009

Before JOHN C. MARTIN, MURRIEL E. CRAWFORD, and
JOSEPH A. FISCHETTI, *Administrative Patent Judges*.

MARTIN, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 34-45, which are all of the pending claims, for obviousness over the prior art. Oral argument was heard on May 21, 2009.

We have jurisdiction under 35 U.S.C. § 6(b) (2002). We affirm-in-part and enter a new ground of rejection under 35 U.S.C. § 101.

A. Appellants' invention

Appellants' claims recite inflation-adjusted financial instruments.

B. The claims

The independent claims are claims 34, 38, and 42, which read as follows:

34. An inflation adjusted financial instrument comprising:
a principal component, the principal component being
periodically adjusted for inflation based on the
Consumer Price Index (CPI) to obtain an inflation-
adjusted principal component;
an accrual component including an interest rate fixed for
a term of the financial instrument;
wherein periodic interest payments are paid based on the
inflation-adjusted principal component at the time
said periodic interest payments are paid; and
wherein the inflation-adjusted principal component
is payable at the end of the term.
38. An inflation adjusted financial instrument comprising:

a principal component;
an accrual component having fixed and variable interest
components payable periodically, said variable
interest component being adjusted for inflation
based on the Consumer Price Index (CPI); and
wherein the principal component is payable at the end of
a term of the financial instrument.

42. An inflation adjusted financial instrument comprising:
a principal component;
an accrual component having fixed and variable interest
components payable at the end of a term of the
financial instrument, said variable interest
component being adjusted for inflation based on
the Consumer Price Index (CPI); and
wherein the principal component is payable at the end of
the term of the financial instrument.

Claims App., Br. 28-29.

C. Related Proceedings

The application on appeal (09/550,752) identifies itself as a
continuation of Application 09/184,752 (Patent 6,052,673), identified as a
continuation of Patent 5,832,461 (based on Application 07/780,834),
identified as a continuation of Application 07/187,054 (abandoned),
identified as a continuation of Patent 4,742,457 (based on Application
06/770,493), filed August 27, 1985. Preliminary Amendment at 1.

The '461 and '673 patents were the subjects of Reexamination Control Nos. 90/005,841 and 90/005,842, respectively. In appeals (Nos. 2005-2642 and 2005-2643) to the Board in both proceedings, the Board affirmed rejections based on different prior art than is before us in this appeal.² Those Board decisions were affirmed in *In re Trans Texas Holdings Corp.*, 498 F.3d 1290, 1301 (Fed. Cir. 2007).

D. The references involved in this appeal

The Examiner relies on the following references:

Robbins	US 4,194,242	Mar. 18, 1980
Youden et al. ("Youden")	US 4,232,367	Nov. 4, 1980

² The affirmed rejections are based on the following references, listed at page 11 of the Board decisions in Appeal Nos. 2005-2642 and 2005-2643:

(a) Musmanno et al. U.S. Patent 4,774,663, issued September 27, 1988.

(b) Zvi Bodie, *An innovation for stable real retirement income*, Portfolio Management, Fall 1980, at 5-13.

(c) Santosh Mukherjee and Claire Orlans, *Indexation in an Inflationary Economy – A Case Study of Finland*, Vol. XL, Broadsheet No. 551, PEP, The Social Science Institute, April 1975, at 50-73 and 106-11.

(d) Persio Arida and André Lara-Resende, *Inertial Inflation and Monetary Reform: Brazil*, in *INFLATION AND INDEXATION* [–] *Argentina, Brazil, and Israel* 27-37 (John Williamson ed., March 1985).

(e) Gloria J. Weiner, *Choosing a home equity plan*, 84 Restaurant Business 100 (Feb. 10, 1985).

Appeal 2009-001227
Application 09/550,752

Aztec Properties, Inc. v. Union Planters Nat'l Bank of Memphis, 530 S.W.2d 756 (1975) ("*Aztec Properties*")

U.S. Department of Labor, Bureau of Labor Statistics, Most Requested Statistics, <http://data.bls.gov/cgi-bin/surveymost?cu>, last visited June 26, 2003 ("U.S. Dept. of Labor")

E. The rejections involved in this appeal

Claims 34, 36, and 37 stand rejected under 35 U.S.C. § 103(a) for obviousness over Youden in view of *Aztec Properties*.

Claim 35 stands rejected under § 103(a) for obviousness over Youden in view of *Aztec Properties* and U.S. Dept. of Labor.

Claims 38, 40-42, 44, and 45 stand rejected under § 103(a) for obviousness over Youden in view of *Aztec Properties* and Robbins.

Claims 39 and 43 stand rejected under § 103(a) for obviousness over Youden in view of *Aztec Properties*, Robbins, and U.S. Dept. of Labor.

THE SCOPE AND MEANING OF THE RECITED
"FINANCIAL INSTRUMENT"

We understand the Examiner to be reading the "financial instrument" recited in claims 34, 38, and 42 on Youden's calculator device rather than on any of the deposit accounts disclosed therein: "[T]he Youden reference discloses a financial instrument having a principal component (the principal amount) that may be periodically adjusted for inflation (by using the financial instrument to calculate the principal amount adjusted for inflation)-col.2, lines 15-25 and 35-40 and col.5, lines 30-48.'"). Answer 3-4. We do

not agree that the recited “financial instrument” can be read on Youden’s calculator device. To do so fails to give weight to the fact that the claims specify that each “financial instrument” comprises “a principal component” and an “accrual component.” We conclude that the term “instrument” as used in the claims has its ordinary and customary meaning of “a legal document (as a deed, will, bond, lease agreement, mortgage, note, power of attorney, ticket on a carrier, bill of lading, insurance policy, warrant, writ) evidencing legal rights or duties, esp. of one party to another.” *Webster’s Third New Int’l Dictionary of the English Language - Unabridged* (1971 ed.) 1172 (copy enclosed).

DOES YODEN DISCLOSE A FINANCIAL INSTRUMENT
HAVING A COMPONENT THAT IS ADJUSTED FOR INFLATION?

Youden explains that as the rate of inflation and, hence, the cost of living grows higher, the need to produce correspondingly higher earnings from one's investments grows greater, especially for persons who need, on a regular basis, a predetermined minimum income on which to live. Youden, col. 1, ll. 7-12. Youden’s invention is a calculating device that is capable of calculating minimum principal which could be deposited in one or more accounts with depletion-of-principal penalties so as to provide both maximum interest and penalty-free payments. *Id.* at col. 1, ll. 34-40.

Youden's Figure 3A is reproduced below:

NO DESIRED PAYMENT AMOUNT SPECIFIED		
Term (4 years)	4.	***
Deposit for Residual	8.88	***
Residual	8.88	***
Interest Rate	7.58	***
Term (3 years)	3.	***
Minimum Deposit	1088.88	***
Monthly Payment	106.89	***
Interest Rate	7.50	***
Term (2 years)	2.	***
Deposit	1088.71	***
Monthly Payment	106.89	***
Interest Rate	7.00	***
Term (1 year)	1.	***
Deposit	1173.49	***
Monthly Payment	106.89	***
Interest Rate	6.50	***
Deposit	1145.48	***
Monthly Payment	106.89	***
Interest Rate	5.25	***
Inflation Rate	8.88	***
Total Deposit	4487.68	***
Residual	8.88	***
Total	4487.68	***

Fig. 3A

Figure 3A shows an example of output data produced by Youden's calculator. *Id.* at col. 1, ll. 66-68. Specifically, these data show the minimum deposits to the various term and passbook accounts required to generate monthly payments of \$106.89 over a period of four years. *Id.* at col. 2, ll. 44-50. During the first year the depositor receives a monthly payment of \$106.89 consisting of principal and interest from the passbook

account, into which \$1,145.40 was deposited at the beginning of the first year. *Id.* at col. 2, ll. 59-62. During this first year, the initial deposits to the term accounts are earning interest at their respective rates. At the end of the first year, the balance in the 1-year term account is transferred to the passbook account, where it is used during the second year to continue to pay the depositor \$106.89 per month. *Id.* at col. 3, ll. 33-38.

The calculator also allows the effects of inflation to be taken into account when making the calculations:

To include the effects of inflation or deflation in the calculations, monthly payments may be increased or decreased each year by a selected percentage. For example, if it is desired that the payments reflect a yearly inflation rate of six percent as shown in FIG. 3F, the user enters the numeric quantity "6.00" by depressing appropriate ones of keys 27 followed by depressing the inflation/deflation (I/D) key 42. If the entered numeric quantity is positive, the monthly payments are increased (inflated) each year by the percentage (e.g., 6%) specified. If the entered numeric quantity is negative, the monthly payments are decreased (deflated) each year by the specified percentage.

Id. at col. 5, ll. 29-41.

Figure 3F, discussed above, is reproduced below:

NO DESIRED PAYMENT AMOUNT SPECIFIED		
\$1000 DEPOSIT-- FOR-RESIDUAL		
6% INFLATION		
Term (4 years)	4.	***
Deposit for Residual	1000.00	***
Residual	1349.82	***
Interest Rate	7.50	***
Term (3 years)	3.	***
Minimum Deposit	1000.00	***
Monthly Payment	106.89	***
Interest Rate	7.50	***
Term (2 years)	2.	***
Deposit	1027.00	***
Monthly Payment	100.04	***
Interest Rate	7.00	***
Term (1 year)	1.	***
Deposit	1044.40	***
Monthly Payment	95.13	***
Interest Rate	6.50	***
Deposit	961.71	***
Monthly Payment	89.74	***
Interest Rate	5.25	***
Inflation Rate	6.00	***
Total Deposit	4033.19	***
Residual	1000.00	***
Total	5033.19	***

Fig. 3F

Figure 3F shows calculations reflecting a yearly inflation rate of six percent.

Id. at col. 5, ll. 31-33.

The \$89.74 monthly payment received by depositor during the first year increases to \$95.13 during the second year, etc.

Appellants do not deny that Youden's term accounts correspond to financial instruments and include a principal component and an interest component.

Appellants argue that although Youden discloses taking inflation into account while calculating the initial deposits for those term accounts, "Youden in no way teaches the *adjustment* of the account for inflation, as the term 'adjustment' necessarily implies a modification to the account *after* the initial deposit is made." Br. 9.

We do not agree. The claim 34 language "the principal component being . . . adjustable for inflation" is broad enough to read on using Youden's calculator to determine the initial deposit amount required for the term accounts in order to compensate for a predicted future value of inflation. Nor does claim 34's additional recitation that the inflation adjustment is based on the Consumer Price Index (CPI) require that the inflation adjustments be made after the term accounts are created. The above-quoted language of claim 34 is broad enough to read on using the calculator to calculate the required initial deposit amounts based on the assumption that the future inflation rate will be the same as the past inflation rate represented by the CPI.

However, Youden does not satisfy the additional requirement of claim 34 for *periodic* inflation adjustments or the requirement for periodic interest payments calculated using an inflation-adjusted principal component. Instead, the interest rate of each of Youden's term accounts is fixed. For this

reason, Youden also fails to satisfy claim 42's requirement for a variable interest component that is adjusted for inflation and claim 38's requirement for a variable interest component that is periodically adjusted for inflation.

DOES *AZTEC PROPERTIES* DISCLOSE A FINANCIAL INSTRUMENT HAVING AN INTEREST COMPONENT ADJUSTED FOR INFLATION?

In contrast to Youden, *Aztec Properties* does disclose an inflation-adjusted financial instrument.

Aztec Properties, which involved an action to recover on a promissory note, describes a financial instrument that included an adjustment for past inflation as reflected in the Consumer Price Index. The court explained:

On July 12, 1974, Aztec Properties, Inc., executed promissory note payable to Union Planters National Bank of Memphis in exchange for a \$50,000.00 loan. The promisor agreed to pay the promisee \$50,000.00, 'in constant United States Dollars adjusted for inflation (deflation)' with interest at ten percent per annum. The adjusted principal was to be calculated according to a formula contained in the note, to wit:

'Amount of principal due shall equal the amount of original principal multiplied by the consumer price index adjustment factor. This adjustment factor shall be computed by dividing the consumer price index at maturity by the consumer price index on date of borrowing. Said consumer price index numbers shall be for the most recent month available preceding borrowing and maturity dates. This consumer price index shall be the index not seasonably adjusted for all items as reported by the United States Department of Labor.'

On maturity of the note Aztec Properties repaid to the bank \$50,000.00, with discounted interest at the rate 9.875 percent, in the amount of \$419.35 (which is an effective yield of 9.96% per annum), but the borrower refused to pay the additional 'indexed principal' of \$500.00, based on the inflation adjustment formula.

Aztec Properties, 530 S.W.2d at 757. We understand the court to be saying that the \$419.35 in interest was paid to the bank as a single payment at maturity along with the \$50,000 in principal. It also appears that the unpaid "indexed principal" amount of \$500.00 was due at that time.

The court characterized the "indexed principal" amount as "interest" (specifically as "usurious interest.") *Id.* at 759. Appellants do not deny that the "indexed principal" amount can accurately be characterized as "interest." As a result, the promissory note in *Aztec Properties* can be characterized as having a fixed (i.e., ten percent) interest component and a variable interest component that is adjusted and payable at maturity based on inflation as measured by the CPI, which appears to satisfy claim 42.

Appellants, after correctly pointing out that "the Youden patent does not teach, either explicitly or inherently, setting up an account that is paid out according to past, known inflation" (Br. 11), argue that "the other cited reference, *Aztec Properties*, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert *Aztec Properties* teaches this element)." *Id.* This argument is unpersuasive with respect to *Aztec Properties* and claim 42 because that claim does not require an account that is paid out according to past, known inflation.

Because Appellants have not demonstrated that claim 42 fails to read on the promissory note disclosed in *Aztec Properties*, we are affirming the rejection of that claim for obviousness over Youden in view of *Aztec Properties* and Robbins.³ For the same reason, we are affirming the rejection of dependent claim 43 (specifying that the CPI index is the “Consumer Price Index for all urban consumers (CPI-U)”) for obviousness over Youden in view of *Aztec Properties*, Robbins, and U.S. Dept. of Labor, as to which claim Appellants merely repeat their claim 42 arguments. Br. 13.

Claim 44, which depends on claim 42, specifies that the financial instrument “comprises a debt instrument.” Appellants argue that *Aztec Properties* fails to disclose a debt instrument. *See* Br. 12 (“the Youden patent does not teach, either explicitly or inherently, a financial instrument comprising a debt instrument. Furthermore, the other cited reference, *Aztec Properties*, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert *Aztec Properties* teaches this element).”). Appellants have not explained, and it is not apparent, why the promissory note described in *Aztec Properties* cannot accurately be

³ In sustaining a multiple-reference rejection under 35 U.S.C. § 103(a), the Board may rely on one reference alone without designating the affirmance as a new ground of rejection. *In re Boyer*, 363 F.2d 455, 458 n.2 (CCPA 1966) (citing *In re Bush*, 296 F.2d 491, 496 (CCPA 1961)).

characterized as a debt instrument. We are therefore affirming the rejection of claim 44 and its dependent claim 45, which is not separately argued.

DO THE CITED REFERENCES DISCLOSE OR
SUGGEST *PERIODIC* INFLATION ADJUSTMENTS TO
PRINCIPAL (CLAIM 34) OR INTEREST (CLAIM 38)?

As explained above, neither Youden nor *Aztec Properties* discloses a financial instrument having *periodic* inflation adjustments for a principal component or a variable interest rate component.

The Examiner asserts that “[t]he use of variable interest rate components in financial instruments is well known in the art” and cites Robbins for a teaching of “a method and system for determining and computing interest rates wherein the interest rate fluctuates (varies) (see abstract).” Non-Final Action 4.⁴ Robbins does not mention adjusting an interest rate for inflation. Instead, Robbins explains that the interest rate fluctuates according to the ratio of a borrower's funds on deposit with the lender to the borrower's outstanding indebtedness (or to the outstanding indebtedness combined with line of credit) at any time, and for the duration of a selected period of time. Robbins, abstract. The Examiner stated that

[w]ith regard to the variable interest rates, the Examiner incorporated Robbins as a teaching of this limitation, since Youden was silent as to the use of variable interest rates. The use of variable or fixed interest rates is well known and practiced by many banks and financial institutions to produce

⁴ The Non-Final Action is incorporated by reference in the Final Action at 2.

profit. Therefore, the Examiner incorporated Robbins as a teaching of variable interest rates, to demonstrate that the rates

may be varied to produce desirable profit when measured against inflation, which may potentially erode profit.

Answer 6.

We agree with Appellants that the cited references fail to disclose or suggest making periodic inflation adjustments to either the principal component (claim 34) or an interest component (claim 38) and are accordingly reversing the rejections of those claims and their dependent claims 35-37 and 39-41.

NEW GROUND OF REJECTION UNDER 35 U.S.C. § 101

Claims 36-45 are rejected under 35 U.S.C. § 101 because the claimed financial instruments are not patent-ineligible subject matter under § 101, which provides:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

35 U.S.C. § 101 (2002).

As explained in *Manual of Patent Examining Procedure* (rev. 7, July 2008) § 2106:

The burden is on the USPTO to set forth a prima facie case of unpatentability. Therefore if USPTO personnel determine that it is more likely than not that the claimed subject matter falls

outside all of the statutory categories, they must provide an explanation. For example, a claim reciting only a musical composition, literary work, compilation of data, >signal,< or legal document (e.g., an insurance policy) per se does not appear to be a process, machine, manufacture, or composition of matter.

Although the claims call for the performance of various actions (e.g., claim 34 recites “the principal component being periodically adjusted for inflation based on the Consumer Price Index” and specifies that “periodic interest payments are paid based on the inflation-adjusted principal component”), those actions represent legal obligations rather than process steps.

Furthermore, assuming for the sake of argument that the claims can be treated as process claims, the claimed subject matter nevertheless would be patent-ineligible. As explained in *In re Bilski*, 545 F.3d 943, 956 (Fed. Cir. 2008), “the machine-or-transformation test, properly applied, is the governing test for determining patent eligibility of a process under § 101.” “The machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article.” *Id.* at 961. Appellants’ claims fail to recite any apparatus or call for transforming any article. As explained in *Bilski*, “[p]urported transformations or manipulations simply of public or private legal obligations or relationships, business risks, or other such abstractions cannot

meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances.” 545 F.3d at 963.

Nor do any of the claimed financial instruments constitute a “machine,” an article of “manufacture,” or a “composition of matter” under § 101. As explained in *In re Nuijten*, 500 F.3d 1346 (2007), a “machine” under § 101 is “a concrete thing, consisting of parts, or of certain devices and combination of devices” (*id.* at 1355) (quoting *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570, 17 L.Ed. 650 (1863)), articles of “manufacture” are “tangible articles or commodities” (*id.* at 1356), and the term “composition of matter” refers to “all compositions of two or more substances and all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids.” *Id.* at 1357 (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980)).

SUMMARY

The Examiner’s § 103(a) rejection of claims 42, 44, and 45 under 35 U.S.C. § 103(a) for obviousness over Youden in view of *Aztec Properties* and Robbins is affirmed, as is the Examiner’s § 103(a) rejection of claim 43 for obviousness over those references further considered in view of U.S. Dept. of Labor. The other rejections by the Examiner are reversed. The

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Examiner's decision that claims 34-45 are unpatentable over the cited prior art is therefore affirmed-in-part.

We have entered a new ground of rejection of claims 34-45 under § 101 for reciting patent-ineligible subject matter.

APPELLANTS' OPTIONS FOR RESPONDING TO
THE DECISION AND NEW GROUND OF REJECTION

Regarding the affirmed rejections, 37 C.F.R. § 41.52(a)(1) (2008) provides that "Appellant may file a single request for rehearing within two months from the date of the original decision of the Board" (emphasis added). The date of this decision appears in the caption at page 1.

Regarding the new ground of rejection pursuant to 37 C.F.R. § 41.50(b), that paragraph explains that "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review." Appellants, within two months from the date of this decision, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the proceeding will be remanded to the Examiner. . . .

(2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

37 C.F.R. § 41.50(b) (2008).

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Should Appellants elect to prosecute further before the Examiner pursuant to 37 C.F.R. § 41.50(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If Appellants elect prosecution before the Examiner and this does not result in allowance of the application, abandonment, or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. §§ 41.50(f), 41.52(b).

AFFIRMED-IN-PART; 37 C.F.R. § 41.50(b)

ELD

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Enclosure: *Webster's Third New Int'l Dictionary of the English Language - Unabridged* (1971 ed.) 1172.

Notice of References Cited	Application/Control No. 09/550,752	Applicant(s)/Patent Under Reexamination Appeal No. 2009-001227	
	Examiner	Art Unit	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
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NON-PATENT DOCUMENTS

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	U	<i>Webster's Third New International Dictionary of the English Language Unabridged</i> , G&C Merriam Co. 1172 (1971).
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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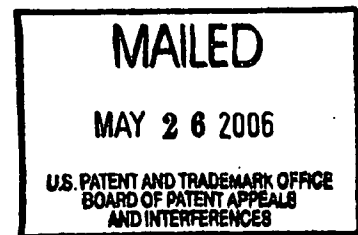
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TRANS TEXAS HOLDINGS CORP.¹

Appeal No. 2005-2642
Reexamination Control No. 90/005,841
Patent 5,832,461²

HEARD: January 24, 2006



Before MARTIN, BLANKENSHIP, and MacDONALD, Administrative Patent Judges.

MARTIN, Administrative Patent Judge.

DECISION ON APPEAL

¹ Trans Texas Holdings Corp. is the owner of the patent under reexamination. The inventors named in the patent are Tomás Leon and Lewis J. Spellman.

² The '461 patent issued based on Application 07/780,834, filed October 23, 1991, which purports to be a continuation of 07/187,054, filed April 27, 1988 (abandoned), which is identified as a continuation of 06/770,493, filed August 27, 1985 (now Patent 4,742,457).

This is an appeal under 35 U.S.C. §§ 134 and 306 from the examiner's final rejection of claims 1-44, which are all of the original patent claims, under 35 U.S.C. § 103(a).³ We affirm.

A. Related litigation

The patent under reexamination in this proceeding (Patent 5,832,461) and the patent under reexamination in Reexamination Control No. 90/005,842 (Patent 6,052,673), which is the subject of pending Appeal No. 2005-2643, were both involved in Trans Texas Holdings Corp. v. Pacific Investment Management Co., Civ. Act. No. A99CA658SS in the United States District Court for the Western District of Texas (Austin). On August 26, 2000, the district court entered a Markman⁴ order (Exhibit E to the brief) construing various terms of the claims of both patents.

In response to a question from the Board at oral argument concerning the dismissal date of the district court action, appellant's counsel requested permission to submit a copy of the district court's docket report, which request was granted. The docket report was faxed to the board on January 25, 2006, and shows that the order dismissing the action was filed on January 8, 2001. A copy of that order, entitled "Order of Dismissal With Prejudice" (incorrectly giving the year as 2000), accompanied the reply brief as Exhibit F.

³ The final Office action ("Final Action") states (at 2, ¶ 4) that claim 10 stands objected to under 37 CFR § 1.75 for being a substantial duplicate of claim 9. At pages 5 and 6 of the brief, appellant correctly notes that the merits of the objection are reviewable by way of a petition to the Commissioner rather than by way of an appeal to the Board. The objection is not repeated in the Answer.

⁴ Markman v. Westview Instruments, Inc., 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed. Cir. 1995), aff'd, 517 U.S. 370, 372, 38 USPQ2d 1461, 1463 (1996).

B. Related appeal

A decision is being mailed concurrently herewith in Appeal No. 2005-2643 in the '842 reexamination, the subject of pending Appeal No. 2005-2643 reexamination proceeding.

C. The invention at issue

The claims are directed to an investment system which includes an inflation-indexed deposit account and preferably also includes an inflation-indexed loan account. Both types of accounts have a principal component representing the initial investment and an accrual component which represents the portion of the account attributable to fixed interest and to inflation adjustments. '461 Patent at col. 2, l. 66 to col. 3, l. 4. Servicing of the accounts is handled by an account management data processor. Id. at col. 3, ll. 52-53. The accounts can be retired in a number of ways:

Under one alternative, the principal component is enhanced by the variable interest component and the account retired by retiring the fixed interest component by one schedule and retiring the principal component by a second schedule. However, the account may be retired by retiring both components over a similar schedule or by amortization. By varying the manner in which each respective component is accrued or retired, the cash flow characteristics of the account can be significantly altered to fit the requisites of the individual or institution.

Id. at col. 3, ll. 13-23.

None of the patent claims have been amended during this reexamination proceeding.

There are three independent claims (1, 24, and 36), of which claim 24 reads:

24. In combination, in an investment system for managing inflation risk:
means for establishing data representative of a deposit account with an
institution, the deposit account having a principal component

representing the cash investment of a depositor for an account term, and an accrual component comprising a fixed interest component which is enhanced at a fixed interest rate times the principal component and a variable interest component which is enhanced at an index responsive to the rate of inflation times the principal component; and
an account management dataprocessor [sic] including means for paying the deposit account over the term.

D. The grouping of the claims

At page 5 of the brief, appellant states that “[f]or purposes of this Appeal, all of the claims shall be considered separately and do not stand or fall together.” Under 37 CFR § 1.192(c)(7) (2001), which was in effect when the brief was filed, a group of claims rejected on the same ground can be treated as standing or falling together unless the brief states that the claims of the group do not stand or fall together and explains why the claims are believed to be separately patentable. As noted below, some of the rejected claims have not been separately argued and thus will be treated as standing or falling with their parent claims.

E. The scope and meaning of the claims⁵

“[D]uring examination proceedings, claims are given their broadest reasonable interpretation consistent with the specification.” In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000) (citing In re Graves, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995); In re Etter, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985) (en banc)).

⁵ The copy of the claims provided in Appendix I to the brief is inaccurate in that it fails to accurately reproduce the formulas recited in claims 12 and 21.

Thus, as explained in In re American Academy of Science Tech Center, 367 F.3d 1359, 1369, 70 USPQ2d 1827, 1834 (Fed. Cir. 2004), which was an appeal from a Board decision in a reexamination proceeding,

the Board is required to use a different standard for construing claims than that used by district courts. We have held that it is error for the Board to “appl[y] the mode of claim interpretation that is used by courts in litigation, when interpreting the claims of issued patents in connection with determinations of infringement and validity.” In re Zletz, 893 F.2d 319, 321 [13 USPQ2d 1320, 1321] (Fed. Cir. 1989); accord In re Morris, 127 F.3d 1048, 1054 [44 USPQ2d 1023, 1028] (Fed. Cir. 1997) (“It would be inconsistent with the role assigned to the PTO in issuing a patent to require it to interpret claims in the same manner as judges who, post-issuance, operate under the assumption the patent is valid.”). Instead, as we explained above, the PTO is obligated to give claims their broadest reasonable interpretation during examination.

Appellant’s reliance (Brief at 7) on the claim interpretation given in the district court’s Markman order is therefore misplaced.

Appellant nevertheless argues (Reply at 4) that we are bound by the district court’s Markman order under the doctrine of issue preclusion discussed in In re Freeman, 30 F.3d 1459, 1465-69, 31 USPQ2d 1444, 1448-51 (Fed. Cir. 1994). This argument fails because the Markman order was not “necessary to the judgment rendered in the previous action,” which is one of the four conditions for application of the doctrine:

Issue preclusion is appropriate only if: (1) the issue is identical to one decided in the first action; (2) the issue was actually litigated in the first action; (3) resolution of the issue was essential to a final judgment in the first action; and (4) plaintiff had a full and fair opportunity to litigate the issue in the first action. A.B. Dick Co. v. Burroughs Corp., 713 F.2d 700, 702, 218 USPQ 965, 967 (Fed. Cir. 1983), cert. denied, 464 U.S. 1042 (1984).

Freeman, 30 F.3d at 1465, 31 USPQ2d at 1448. Regarding claim interpretation, the Freeman court further explains:

In the context of claim interpretation, this court has held that judicial statements regarding the scope of patent claims are entitled to collateral estoppel effect in a subsequent infringement suit only to the extent that determination of scope was essential to a final judgment on the question of validity or infringement.

A.B. Dick Co., 713 F.2d at 704, 218 USPQ at 968. This court has warned, however, that statements regarding the scope of patent claims made in a former adjudication should be narrowly construed. Id. Additionally, to apply issue preclusion to a claim interpretation issue decided in a prior infringement adjudication, "the interpretation of the claim had to be the reason for the loss [in the prior case] on the issue of infringement." Jackson Jordan, Inc. v. Plasser American Corp., 747 F.2d 1567, 1577, 224 USPQ 1, 8 (Fed. Cir. 1984).

Freeman, 30 F.3d at 1466, 31 USPQ2d at 1449. The district court action at issue here concluded with a dismissal rather than with a judgment on validity or infringement.

In giving claims their broadest reasonable construction, the PTO will "tak[e] into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification." Morris, 127 F.3d at 1054, 44 USPQ2d at 1027. However, we are not permitted to read limitations from the disclosed embodiments or examples into the claims. See American Academy, 367 F.3d at 1369, 70 USPQ2d at 1834:

We have cautioned against reading limitations into a claim from the preferred embodiment described in the specification, even if it is the only embodiment described, absent clear disclaimer in the specification. See Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 906 [69 USPQ2d 1801] (Fed. Cir. 2004) ("Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction.'"); Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 [63 USPQ2d 1374] (Fed. Cir. 2002).

The principal point of contention regarding the scope and meaning of the claims is the relationship between the rate of prior actual inflation and the resulting inflation adjustments of the deposit and loan accounts. Appellant contends that the claims require a continuous (i.e., nonstepped) relationship such that different amounts of prior actual inflation will result in different inflation adjustments. For the following reasons, we do not agree.

Each of the independent claims (1, 24, and 36) calls for either adjusting an amount "in a manner responsive to the rate of inflation" (claims 1 and 36) or enhancing a component "responsive to the rate of inflation" (claim 24). Appellant's argument for a continuous relationship rests on the following definition of "responsive to the rate of inflation" in the specification: "Responsive to the rate of inflation, as used herein, means directly responsive to a market indicator of prior actual inflation and it is not meant to include the market's expectation of future inflation." '461 Patent at col. 3, ll. 11-14. This definition has several possible interpretations. It can be construed as defining (1) only the phrase "responsive to the rate of inflation"; (2) the phrase "the rate of inflation" (our emphasis), whether or not preceded by "responsive to"; or (3) the phrase "rate of inflation," whether preceded by "a" or "the." We conclude that interpretation (3) is the broadest reasonable one and will so construe the phrase "rate of inflation" in all of the claims. As for the effect of the use of "directly responsive to" instead of "responsive to" in the definition, the broadest reasonable interpretation of the chosen phraseology is that it was meant to emphasize that the calculations of inflation adjustments must be based on the market indicator data which represents prior actual inflation (e.g., the CPI-U). See The American Heritage Dictionary of the English Language 373 (copy enclosed) (New

College Edition, 1975) (hereinafter American Heritage Dictionary) (defining “directly” to mean:

“1. In a direct line or manner; straight. . . . 2. Without anyone or anything intervening; immediately.”). Nothing in the specification clearly evidences an intent to have the phrase “directly responsive to” construed as requiring a continuous relationship.

Appellant’s argument that the foregoing definition from the ‘461 patent requires us to construe the claims as requiring that the inflation adjustments be a continuous function of the rate of prior actual inflation is wrong on two counts. First, as explained above, the phrase “directly responsive to” in the definition does not imply a continuous relationship. Second, even assuming it does, the definition does not address the relationship between the inflation adjustments and the rate of inflation. Instead, it addresses the relationship between the inflation adjustments and “a market indicator of prior actual inflation,” which need not represent the rate of prior actual inflation. In fact, appellant’s disclosed market indicators of prior actual inflation represent inflated price levels, from which the inflation rates and the resulting inflation adjustments are calculated:

Once the current inflation index (CPI_c) is determined, the level of inflation since the last reporting period is estimated by consideration of a preselected inflation index which reflects prior actual inflation. A preferred embodiment of the present invention utilizes the consumer price index CPI-U, for all items. However, any number of indexes may be successfully utilized including, but not limited to CPI-W, Producer Price Index, the Implicit Price Deflator for the Gross National Product, or any component of these price level measures so long as the index reflects some measure of past inflation. The level [of] inflation which has occurred since the previous iteration period can be determined by the formula:

$$\frac{CPI_c - CPI_o}{CPI_o}$$

Where CPI_o is the inflation index at the time of the last iteration, or the initial index if the present iteration is the first.

'673 Patent at col. 6, ll. 27-46 (emphasis added). "If . . . inflation has occurred during the prior iteration period, the cash outflow or disbursement attributable to the effects of inflation on the account balance is determined by applying the inflation rate to the deposit balance." *Id.* at col. 6, ll. 58-62. Because the "market indicator of prior actual inflation" need not represent the rate of prior actual inflation, a claim recitation that an inflation adjustment is "responsive to a rate of inflation" should be understood as requiring no more than that the inflation adjustment be (a) "responsive to" the rate of prior actual inflation and (b) "directly responsive to" (i.e., based on) the data of a market indicator of prior actual inflation, which may represent inflated price levels rather than inflation rates.

Appellant's reliance on the district court's Markman order (Brief at 7) for a narrower definition is improper for the reasons given above. Also, because it is improper to read disclosed examples into the claims, American Academy, 367 F.3d at 1369, 70 USPQ2d at 1834, we are unpersuaded by appellant's argument that

[i]n each of the examples in the '461 specification, the inflation component is adjusted for any amount of inflation, and adjusted on a one-for one basis. '461 specification, col. 10 to col. 26. Accordingly, reading the definition and the examples, one of skill would understand that there must be a direct

correspondence between the rate of inflation and the amount by which the variable interest component is adjusted.

Brief at 6-7.

Moving on to the next construction question, each of the independent claims additionally calls for the deposit account (claims 1, 24, and 36) and the loan account (claim 36) to have a “term,” which is defined by several passages in the specification. The first reads: “As referred to herein, the account term is the time period over which the account is retired or ‘paid out’ to the account holder.” ‘461 Patent at col. 3, ll. 41-43. While this definition is ambiguous regarding whether the term begins when the account is opened or with the first payout or retirement payment, that ambiguity is removed by the explanation that “[t]he term of the account is the length of time from the initial deposit until maturity (i.e., when the account has been entirely retired).” ‘461 Patent at col. 4, ll. 61-64.⁶ Neither of these definitions nor any other language in the independent claims requires that the claimed “term” of an account be predetermined, as argued by appellant in (a) characterizing claim 24 as including “the requirement . . . that the accounts have a specified term for paying out the account,” Brief at 10, and (b) criticizing the accounts disclosed in the Mukherjee reference on the ground that they “did not have a particular pre-set term for payout.” *Id.* While the ‘461 patent states that “[t]he account term is generally divided into a plurality of adjustment or iteration periods” and explains that “terms may be scheduled to include only a single iteration” (emphasis added), col. 3, ll. 43-45, this language

⁶ The “duration” of an account is “a mathematical expression of when the average time-weighted dollar is paid out of the account.” ‘461 Patent at col. 4, ll. 64-66.

does not require that the number of plural adjustment or iteration periods be set in advance; nor does it require that the retirement date of a single-iteration account be specified in advance. Nor does the phrase "schedule over a term," which is employed in some claims, imply plural iteration periods and thus preclude a single iteration and lump sum payment. To the contrary, claim 4, which depends on claim 1, specifies that the "means for paying the deposit principal component according to a second schedule over the term," recited in claim 1, comprises "a lump sum payment at the end of the term."

F. The references

The rejections rely on the following references:

4,774,663	Musmanno et al. (hereinafter "Musmanno")	Sep. 27, 1988 (filed Nov. 21, 1983)
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Zvi Bodie, An innovation for stable real retirement income, Portfolio Management, Fall 1980, at 5-13 ("Bodie").

Santosh Mukherjee and Claire Orlans, Indexation in an Inflationary Economy – A Case Study of Finland, Vol. XL, Broadsheet No. 551, PEP The Social Science Institute, April 1975, at 50-73 and 106-11 ("Mukherjee").⁷

Persio Arida and André Lara-Resende, Inertial Inflation and Monetary Reform: Brazil, in INFLATION AND INDEXATION – ARGENTINA, BRAZIL, AND ISRAEL 27-37 (John Williamson ed., (March 1985) ("Williamson").

⁷ A better copy of Mukherjee than is currently of record accompanies this decision.

G. The grounds of rejection

Claims 24-26, 28-32, 34-37, and 38-44⁸ stand rejected under 35 U.S.C. § 103(a) as unpatentable over Mukherjee in view of Musmanno.

Claims 1-23, 31, 33, and 44 stand rejected under § 103(a) as unpatentable over Mukherjee in view of Bodie and further in view of Musmanno.

Claims 27 and 38 stand rejected under § 103(a) as unpatentable over Mukherjee in view of Musmanno and Williamson.

H. The Mukherjee and Musmanno references

Mukherjee describes the Finnish experience with inflation-indexing in various areas, including bank deposit accounts (at 50-56), government- and industry-issued bonds (at 57-63), social security, pensions, and insurance (at 63-66), bank loans (at 67-69), and commercial and property contracts (at 70-73).

The Finnish banking system was divided into three groups: (a) commercial savings; (b) cooperative; and (c) Post Office. Mukherjee at 50, 1st para. "As the rapid inflation of 1950-1 was being checked by the stabilisation programme begun in October 1951, the banks took the decision, in principle, to adjust both their loans and deposits for inflation, on the basis of quarterly inspections of the cost-of-living index." *Id.* at 50, second para. While "[t]he initial

⁸ The inclusion of claim 38 in the statement of this ground of rejection is obviously a typographical error, because that claim is not mentioned in the discussion of this ground of rejection in the Final Action (at 3-14, ¶¶ 7-23) or in the Answer (at 3-12, ¶¶ 2-18). Instead, it is addressed only in the discussion of the rejection based on Mukherjee, Musmanno, and Williamson. Final Action at 28, ¶ 52; Answer at 23-24, ¶ 46.

idea had been to apply an extra charge to all loans equal to half the rise in the index, and then to use the funds to compensate all depositors for half their loss due to inflation," id. at 50, 4th para., that initial idea was not adopted. Instead,

[w]hat was eventually decided was different and more complex. Not all deposits were index-linked, but only specifically designated accounts carrying certain restrictions on withdrawal. Full inflation proofing was given to these designated accounts. The money needed to make them keep pace with the cost of living was found by imposing an 'index surcharge' on all loans. The amount of the surcharge was usually fixed according to the proportion of the bank's deposits benefiting by index adjustment, so that the bank could just balance its commitments.

Id. at 50-51. The first index-linked bank deposit accounts went into effect in May 1955 and had the following characteristics:

- (1) A lump sum of 30,000 markka was required to open the account;
- (2) Withdrawals were not permitted during the first year;
- (3) The fixed interest paid on the account balance was 1 to 1½ percentage points below that paid for normal deposits; and
- (4) They did not share the tax exemption enjoyed by ordinary savings accounts.

Mukherjee at 51, 2d full para.

Furthermore, the indexing feature operated in a stepped, discontinuous manner rather than a continuous manner:

Once the cost-of-living index (October 1951 = 100) had risen 2 points above 104, the capital was increased by as many as 2 full per cents as the index had risen between deposit and withdrawal. The figures used were the averages (to the nearest whole number) of the index values for the three months before deposit and withdrawal respectively. The system did not work the other way; no reduction would take place if the index fell.

Id. at 51, 3d full para. In January 1957, a choice of two kinds of index-linked accounts became available to the public: in addition to the above taxable accounts, thereafter called 'A' accounts, 'B' accounts were offered which were tax-free (like normal, nonindexed deposit accounts) but gave only 50 per cent index compensation. Id. at 52, 2d full para. The interest rates for the two types of accounts were as follows:

'A' and 'B' accounts at first carried the same basic rate of interest of 4¼ per cent. In January 1957, when 'B' accounts started, the index clause for 'A' accounts was made more sensitive. Compensation was now to be paid for full 1 per cent changes in the cost-of-living index, instead of full 2 per cents. 'B' accounts received exactly half the index-related compensation rate paid on 'A' accounts.

Id. at 54, 4th full para. We agree with the examiner that the phrase "basic rate of interest" in the foregoing passage refers to a fixed rate of interest. Final Action at 4, ll. 1-3. Appellant does not contend otherwise.

'B' accounts suffered a death blow when 'A' accounts, which provided full indexing, were freed from taxation. Mukherjee at 56, 2d para.

Under the heading "Sudden death," Mukherjee explains that in March 1968, a stabilization agreement signed by the central trade union and employer organizations abolished the system of index linkage for wages, rents, business contracts, bonds, and bank deposits and precluded the index clause from being applied to bank deposits after November 30, 1968. Id. at 56, 4th para.

In the discussion of inflation-indexed government and industry bonds, Mukherjee notes that "[b]anks and cooperative credit societies needed the income from index bonds to held pay

compensation on indexed deposit accounts," id. at 59, 1st full para., and in the discussion of inflation-indexed loans further explains:

Banks started to make indexed charges on loans when their indexed deposit business became of appreciable size. In the savings and cooperative bank sector this was in 1956. Similar charging arrangements by the commercial banks did not come into operation until rather more than a year after that. This part of the banking sector had interrupted this business for a year, and initially were able to cover indexed payments to depositors with income from their holdings of government indexed bonds.

The Post Office Bank usually tied its loans 25 per cent to the cost-of-living index. All other banks operated on the principle of calculating an index surcharge on all loans at rates just sufficient to cover indexed payments to depositors. This meant, for example, that in a year when the index rose by 10 per cent, a bank with one fifth of its deposits in fully index-linked accounts would place an index surcharge of 2 per cent on all its outstanding loans. This surcharge became payable immediately by borrowers as additional interest; the outstanding debt was not, however, written up.

Id. at 67-68.

The examiner relies on Musmanno primarily for its disclosure of using a data processor to handle a securities brokerage and cash management system. Specifically, Musmanno's figures depict, in flow-chart form,

a data processing implementation for a brokerage-cash management financial system which provides for automatic investment of free credit cash balances in short term investments which include an insured savings account option; a full range of security brokerage transaction functions; which permits consumer transaction ("charge") card and check charges; and which includes safeguards against abuses., e.g., check kiting.

Musmanno, col. 1, ll. 24-33. Appellant concedes that these flow charts represent operations performed by a data processor. See Brief at 11 ("Musmanno . . . teaches the use of a specific type of data processing to manage a specific type of account, the so-called Cash Management

Account. Musmanno teaches specific software for carrying this function out, which is shown, for example, in Figures 1A, [1B], 2, 3 and 4.”).

The examiner does not contend that Musmanno discloses using a data processor to service inflation-indexed accounts.

I. The merits of the rejection of claims 24-26, 28-32, 34-37, and 39-44 for obviousness over Mukherjee in view of Musmanno

The legal conclusion that a claim is obvious within § 103(a) depends on at least four underlying factual issues: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) an evaluation of any relevant secondary considerations. See Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). As explained in Princeton Biochemicals Inc. v. Beckman Coulter Inc., 411 F.3d 1337, 75 USPQ2d 1051, 1054 (Fed. Cir. 2005), it is also necessary to consider the question of motivation:

As this court pointed out in Ruiz v. A.B. Chance Co., 357 F.3d 1270, 1275 [69 USPQ2d 1686, 1690] (Fed. Cir. 2004), in making the assessment of differences between the prior art and the claimed subject matter, section 103 specifically requires consideration of the claimed invention “as a whole.” . . .

. . . This “as a whole” assessment of the invention requires a showing that an artisan of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would have selected the various elements from the prior art and combined them in the claimed manner. Id. In other words, section 103 requires some suggestion or motivation, before the invention itself, to make the new combination. See In re Rouffet, 149 F.3d 1350, 1355-56 [47 USPQ2d 1453, 1456] (Fed. Cir. 1998).

Appellant has not submitted any declarations or affidavits addressing the level of

ordinary skill in the art. Therefore, the level of skill in the art must be ascertained from the references themselves. See In re Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978) ("the PTO usually must evaluate both the scope and content of the prior art and the level of ordinary skill solely on the cold words of the literature"); In re GPAC Inc., 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995) (Board did not err in adopting the approach that the level of skill in the art was best determined by the references of record).

In the absence of any indication to the contrary by the examiner, we assume the rejected claims are entitled to the benefit under 35 U.S.C. § 120 of the August 27, 1985, filing date of Application 06/770,493, the earliest of the chain of "continuation" applications that led up to the application which issued as the patent under reexamination.

Claim 24 reads:

24. In combination, in an investment system for managing inflation risk:
means for establishing data representative of a deposit account with an institution, the deposit account having a principal component representing the cash investment of a depositor for an account term, and an accrual component comprising a fixed interest component which is enhanced at a fixed interest rate times the principal component and a variable interest component which is enhanced at an index responsive to the rate of inflation times the principal component; and
an account management dataprocessor [sic] including means for paying the deposit account over the term.

Before comparing claim 24 to Mukherjee, we will address the examiner's reliance on Musmanno as evidence that "it was notoriously well-known to employ data-processors to manage plural accounts," Final Action at 4-5, ¶ 7, and the examiner's assertion that it therefore would have been obvious to "automate MUKHERERJEE [sic] et al. on a data-processor such as

MUSAMANNO [sic] et al. in order to facilitate account management.” Id. at 5, ¶ 7 (underlining omitted). We agree that it would have been obvious in view of Mukherjee and Musmanno, prior to appellant’s August 27, 1985, effective filing date, for a bank to offer inflation-indexed deposit and loan accounts and to service the accounts with a data processor in order to obtain the speed and accuracy offered by automated (as opposed to manual) processing. Appellant’s argument that Musmanno’s software is “totally inapplicable to the issue at hand: the adjustment and management of inflation-indexed accounts,” Brief at 11, is unconvincing because the examiner is not proposing to use Musmanno’s disclosed software to service Mukherjee’s inflation-indexed accounts. “Claims may be obvious in view of a combination of references, even if the features of one reference cannot be substituted physically into the structure of the other reference.” Orthopedic Equip. Co, Inc. v. United States, 702 F.2d 1005, 1013, 217 USPQ 193, 200 (Fed. Cir. 1983) (citing In re Anderson, 391 F.2d 953, 958, 157 USPQ 277, 281 (CCPA 1968)). Instead, what matters in the § 103 nonobviousness determination is whether a person of ordinary skill in the art, having all of the teachings of the references before him, is able to produce the structure defined by the claim. Orthopedic Equip., 702 F.2d at 1013, 217 USPQ2d at 200 (citing In re Twomey, 218 F.2d 593, 596, 104 USPQ 273, 275 (CCPA 1955)). On this point, appellant argues:

The complexity of the data processing required for carrying out the claimed invention is evident in the four examples of data processing systems described in the subject patent specification (see Figures 2-5), along with the numerous and varied permutations of these four systems that they enable and that would be evident to those of skill in light thereof, which provide those of skill with the basic understanding to [sic] necessary to overcome the problems that

faced the Finnish system and that apparently led to the "Sudden Death" of that system.

Brief at 12. This argument fails for several reasons, the first of which is that, as noted above, Mukherjee attributes the "[s]udden death" of the Finnish system of providing inflation-adjusted accounts to the 1968 trade agreement which abolished inflation indexing. Mukherjee at 56, 4th para. Second, appellant has not explained, and it is not apparent from an examination of appellant's Figures 2-5, why appellant believes a programmer⁹ having ordinary skill in the art just prior to appellant's effective filing date would have been unable to design suitable data processing software for implementing inflation-adjusted accounts of the type disclosed in Mukherjee.

Claim 24 recites, inter alia, "a variable interest component which is enhanced at an index responsive to the rate of inflation times the principal component." Appellant's contention that this language requires that the index and resulting variable interest component be a continuous function of the rate of prior actual interest is unconvincing. For the reasons given above in the discussion of the definition at column 3, lines 11-14, it is only necessary for the index and resulting variable interest component to be (a) responsive to the rate of inflation and (b) directly responsive to (i.e., based on) a market indicator of prior actual inflation. The examiner is therefore correct to read the claimed "means for establishing data representative of a deposit account with an institution . . ." on inflation-indexed deposit accounts of the type described by

⁹ Where an invention involves two technologies (here, computer programming and financial systems), the person having ordinary skill is presumed to have ordinary skill in both technologies. In re Brown, 477 F.2d 946, 950-51, 177 USPQ 691, 694 (CCPA 1973).

Mukherjee, including the 'A' and 'B' deposit accounts discussed at pages 51-56. Final Action at 3-4, ¶ 7. We note that this claimed means alternatively reads on the initially proposed accounts that were not adopted, which are described at page 50, last paragraph ("The initial idea had been to apply an extra charge to all loans equal to half the rise in the index, and then to use the funds to compensate all depositors for half their loss due to inflation."). Furthermore, assuming for the sake of argument that the index and resulting variable interest component must be continuous (i.e., nonstepped) functions of the rate of the prior actual inflation, the initially proposed accounts were to operate in that manner. See Mukherjee at 50, last para. The fact that the initially proposed accounts were never adopted does not detract from Mukherjee's status as a reference teaching the desirability of such accounts. See In re Sivaramakrishnan, 673 F.2d 1383, 1384-85, 213 USPQ 441, 442 (CCPA 1982):

That Gable may not have actually reduced the specific mixture of resin and cadmium salt to practice has no bearing on whether the mixture is "described in a printed publication" under §102(b). See e.g., Mannix Co. v. Healey, 341 F.2d 1009, 1010 n.1, 144 USPQ 611, 612 n.1 (CA 5 1965); Siegel v. Watson, 267 F.2d 621, 624, 121 USPQ 119, 121 (CA DC 1959); Ritter v. Rohm & Haas Co., 271 F. Supp. 313, 341, 154 USPQ 518, 542 (S.D.N.Y. 1967). Cf. In re Deters, 515 F.2d 1152, 1155, 185 USPQ 644, 647 (CCPA 1975) (that a reference is a "paper patent" is irrelevant to its value as evidence of level of skill in the art); In re Blake, 53 CCPA 720, 724, 352 F.2d 309, 312, 147 USPQ 289, 291 (1965) (patent statute does not require commercial use of subject matter of a prior-art disclosure for that disclosure to qualify as a reference).

Appellant's argument that Mukherjee's indexed deposit accounts do not have predetermined, fixed terms and therefore fail to satisfy claim 24's requirement for a deposit account "term" is also unconvincing. As explained supra, the account "term" is not defined in the specification or in the claims as being predetermined and fixed and thus is broad enough to

read on the period running from the opening date of the account to the closing date of the account. Furthermore, assuming for the sake of argument that the claimed account "term" should be construed as being predetermined, we agree with the examiner (Final Action at 3, ¶ 7) that it would be satisfied by Mukherjee's disclosure (at 51, 2d full para.) that withdrawals were not permitted from indexed accounts during the first year, which effectively establishes a predetermined, one-year minimum term for those accounts. Finally, assuming for the sake of argument that the claimed account "term" must be even more narrowly construed as being both predetermined and fixed, we also agree with the examiner that it would have been obvious to implement inflation-indexed accounts of the type disclosed by Mukherjee as certificate of deposit (CD) accounts having fixed terms. More particularly, the examiner noted that "CD[s] explicitly had terms." Final Action at 34, ¶ 57. Although the examiner did not state that he was taking official notice that CDs having fixed terms were known in the art prior to appellant's filing date, we hold that that subject matter is clearly appropriate for official notice. See In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420-21 (CCPA 1970) (PTO tribunals, where it is found necessary, may take notice of facts beyond the record which, while not generally notorious, are capable of such instant and unquestionable demonstration as to defy dispute). Furthermore, although the examiner did not explain how the "prior art as a whole" would have suggested implementing inflation-indexed deposit accounts of the type disclosed by Mukherjee as CDs, it is evident his position is that in view of Mukherjee's disclosure of preventing withdrawals from the inflation-indexed accounts during the first year and the fact that CDs were known to have fixed terms (typically with a penalty for early withdrawal), it would have been obvious to implement

such inflation-indexed accounts as CDs having predetermined, fixed terms of one year or more. We agree. The obvious advantage to the bank of holding deposits in the form of CDs is to reduce the likelihood of withdrawal before the end of the specified term. Appellant's discussion of the "term" limitation in this claim (Brief at 10) fails to address the examiner's reliance on CDs or explain why it would have been unobvious to implement inflation-indexed deposit accounts of the type disclosed by Mukherjee as CDs.

For the foregoing reasons, we are affirming the rejection of claim 24.

Dependent claim 25 specifies that the deposit account term is divided into a plurality of iteration periods. Claim 26 depends on claim 25 and calls for enhancing the fixed interest component in accordance with the fixed interest rate for the previous iteration period. The examiner asserts that the use of plural iteration periods

was notoriously well-known and ubiquitously in use, and further explicitly demonstrated by MUSAMANNO [sic] et al.: "daily iteration"—col. 6, lines 5-10; col. 6, lines 19-21. It would have been obvious . . . to divide the account into iteration periods, in order to compound interest payments accurately for an arbitrary deposit term, and in order to maximize compounding as was well-known in the art and suggested by MUSAMANNO et al. (col. 6, lines 19-21).

Final Action at 5, ¶ 25 (emphasis omitted). Appellant's argument that Mukherjee's inflation-indexed accounts do not have a "term" which can be divided into a plurality of iterations, Brief at 12; Reply brief at 5, is unconvincing for the reasons given in the discussion of "term" in claim 24.

Appellant also argues (Brief at 13) that the examiner's reliance on alleged "common knowledge" of interest compounding contravenes *In re Lee*, 277 F.3d 1338, 61 USPQ2d 1430,

1434 (Fed. Cir. 2002). This argument is unconvincing because the examiner is not relying on a nonspecific assertion of common knowledge; rather, he is relying on the artisan's knowledge of certificates of deposit and interest compounding techniques and advantages, and thus satisfies Lee's requirement that general knowledge, when relied on to negate patentability, "must be articulated and placed on the record." 277 F.3d at 1345, 61 USPQ2d at 1435. Interest compounding over a plurality of iteration periods, such as daily, monthly, or quarterly, unquestionably constituted general knowledge in the art and thus is suitable subject matter for official notice under Ahlert and appropriately relied on for motivation under Lee.

For the foregoing reasons, we are affirming the rejection of claims 25 and 26.¹⁰

Claim 28, which also depends on claim 25 (reciting plural iteration periods), specifies that the fixed interest rate is "compounded continuously." This phrase is not defined in the specification but is described at <http://www.riskglossary.com/link/compounding.htm> (copy enclosed) as the limiting case of interest compounding, in which interest is credited on a continuous basis (i.e., every instant). The examiner's position is that "continuous compounding of interest was notoriously well-known and ubiquitous in the technical field of endeavor" and that it would have been obvious to apply such compounding to Mukherjee's accounts "in order to maximize compounding and thus attract lenders (e.g., depositors)." Final Action at 6-7, ¶ 10. Appellant responds, "While the Patent Owner would generally agree that continuous compounding was known for conventional deposit accounts, the Patent Owner does not agree

¹⁰ Dependent claim 27 stands rejected on a different ground, discussed infra.

that one of skill would have found it obvious to apply such compounding in the context of an indexed account.” Brief at 14. This argument is unconvincing because it fails to address the examiner’s proposed motivation, which we find persuasive, for applying continuous compounding to the fixed interest component of Mukherjee’s accounts. The rejection of claim 28 is therefore being affirmed.

The rejection of claims 29-32, which are dependent on claim 24, rejected over the same prior art as claim 24, and not argued separately from claim 24, is affirmed for the same reasons as the rejection of claim 24. 37 CFR § 1.192(c)(7) (2001).¹¹

Claim 34, which depends on claim 24 and is separately argued, specifies that the deposit account is “being used to finance property of the institution.” The phrase “property of the institution” is not defined in the specification of the ‘461 patent. As in our discussion of claim 24, we are reading the term “institution” on banks offering inflation-indexed deposit accounts of the type described at pages 50-56 of Mukherjee. Regarding claim 34, the examiner argues that Mukherjee

discloses [the] claimed: “deposit account being used to finance property of the institution” (“apply an extra charge to all loans equal to half the rise in the index, and then use the funds to compensate . . . depositors”—page 50, col. 1. Furthermore, it is noted that banks inherently acquire assets, because that is one of the functions of a bank, and was necessary to maintain solvency. It is further taught by the application to “Mortgage Banks” (p. 61). Regarding implicit and inferred teachings relied upon, it is noted that ‘an artisan is likely to extract more than a layman from reading a reference’—In re Oetiker (CAFC) 24 USPQ2d 1443 (10/13/1992).

¹¹ Of these claims, claim 31 is also rejected on another ground, addressed infra.

Final Action at 8-9, ¶ 15. We agree with appellant that the examiner is incorrect to characterize the deposit accounts as "property" of the institution. Brief at 14. However, there is merit to the examiner's assertion that banks inherently acquire assets (i.e., property) and his implication that the assets are acquired, at least in part, with money that has been received in the form of deposits for deposit accounts. Final Action at 9, ¶ 15. Tangible examples of such property include the building which houses the bank and the equipment and furniture contained therein. The rejection of claim 34 is therefore affirmed.

Claim 35 depends on claim 24 and specifies that the deposit account is "secured by the property of the institution." The phrase "property of the institution" is broad enough to read on any type of property which is used to protect the integrity of the data representing the deposit accounts and thus includes known building security techniques and known electronic security techniques for the data processing computers. The examiner is therefore correct to argue that "this was a well-known method of running a bank. It would have been obvious . . . to secure the accounts of MUKHERERJEE [sic] et al. and MUSAMANNO [sic] et al. in order to assure depositors, and thus attract depositors, and in order to make money on deposits." Final Action at 9, ¶ 16 (underlining omitted). Appellants' denial that "it was a [sic] 'well known' for a bank to secure a deposit account with funds on deposit with that institution," Brief at 15, ¶ h, was correctly dismissed by the examiner on the ground that the claim does not require that the securing "property" be in the form of deposited funds. Final Action at 38, ¶ 63.

Appellant also complains (Brief at 15, ¶ h; Reply brief at 7) that the examiner failed to respond to appellant's earlier request under 37 CFR § 104(d)(2)¹² to make of record whatever evidence he has which supports his position regarding the unpatentability of claim 35.¹³ This request for a § 104(d)(2) affidavit or declaration by the examiner is clearly inappropriate because the examiner is relying not on personal knowledge but on the general knowledge of persons having ordinary skill in the banking art that it was standard practice to provide security for deposit accounts. This assertion of general knowledge is specific enough to satisfy Lee's requirement that general knowledge, when relied on to negate patentability, "must be articulated and placed on the record." 277 F.3d at 1345, 61 USPQ2d at 1435.

The rejection of claim 35 is therefore affirmed.

Independent claim 36 reads as follows:¹⁴

36. A system for managing deposit and loan accounts, comprising:
 means for establishing data representative of at least one deposit account for a term;
 means for establishing data representative of at least one loan account for a term, the loan account having a loan principal component and a

¹² Section 1.104(d)(2) (2005) reads:

(2) When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible, and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons.

¹³ This request appeared in the "Response to Office Action Dated July 25, 2001," at 6.

¹⁴ Claim 36 is incorrectly reproduced in Appendix I to the brief, which fails to include the change made by the Certificate of Correction, dated September 26, 2000.

loan accrual component, the loan accrual component having a fixed interest component and a variable interest component;
an account management dataprocessor [sic] for servicing the accounts over the term, comprising:
means for adjusting the amount in the deposit account in a manner responsive to the rate of inflation;
means for paying out the deposit account;
means for determining the amount in the loan accrual component in a manner responsive to the rate of inflation; and
means for retiring the loan account over the term, including
means for retiring the fixed interest component by a first schedule over the term, and
means for retiring the loan principal component by a second schedule over the term.

Dependent claim 37 additionally recites “means for retiring the variable interest component by a third schedule over the term.”

As noted supra, the phrase “schedule over a term” can consist of a single iteration, such as a lump sum payout. Furthermore, the recitation of a first, a second, and a third “schedule over a term” does not imply that the schedules are different. In fact, dependent claim 38 (the subject of a different ground of rejection, addressed infra) specifies that all three schedules are the same.

For the reasons addressed above, it would have been obvious in view of Musmanno to automate the management of inflation-adjusted deposit and loan accounts like those disclosed in Mukharjee order to obtain improvements in speed and accuracy over manual account management. The claimed “means for paying out the deposit account” reads on such automated, inflation-indexed accounts regardless of how the deposit account is paid out. Likewise, the claimed means for retiring loan principal component over the term, the claimed means for retiring the fixed interest component by a first schedule over the term, and the means for retiring

the variable interest component by a second schedule over the term are broad enough to read on inflation-indexed loan accounts of the type disclosed by Mukharjee no matter how or when those components are retired.

Appellant's argument that Mukherjee's inflation-indexed deposit accounts are not "directly responsive to the rate of inflation" (Brief at 16) is unconvincing for the reasons given above in the discussion of claim 24. Appellant's similar argument (Brief at 16) with respect to Mukherjee's inflation-indexed loan accounts is unpersuasive for the following reasons. First, claim 36 as construed in light of the definition at column 3, lines 11-14, requires no more than that the amount in the loan accrual component be (a) "responsive to the rate of inflation" and (b) "directly responsive to" (i.e., based on) a market indicator of prior actual inflation, which may represent inflated prices levels rather than the inflation rate. Second, even assuming for the sake of argument that there must be continuous (i.e., nonstepped) relationship the loan accrual component and the rate of prior actual inflation, Mukherjee's initially proposed accounts (at 50, last para.) were to operate in that manner, as were the loans offered by the Post Office Bank, which tied its loans to 25 per cent of the cost-of-living index:

Banks started to make indexed charges on loans when their indexed deposit business became of appreciable size. . . .

The Post Office Bank usually tied its loans 25 per cent to the cost-of-living index. All other banks operated on the principle of calculating an index surcharge on all loans at rates just sufficient to cover indexed payments to depositors. This meant, for example, that in a year when the index rose by 10 per cent, a bank with one fifth of its deposits in fully index-linked accounts would place an index surcharge of 2 per cent on all its outstanding loans. This surcharge became payable immediately by borrowers as additional interest; the outstanding debt was not, however, written up.

Id. at 67-68. Appellant's discussion of claim 36 (Brief at 16) fails to mention the Post Office Bank approach, let alone explain why it fails to provide a continuous relationship between the amount of the loan accrual component and the inflation rate. Instead, appellant explains why the "directly responsive" requirement is not believed to be satisfied by the above-quoted approach followed by the "[a]ll other banks," a question we need not decide.

Appellant argues that claim 36 "require[s] both a deposit account and a loan account, and require[s] that both be adjusted in a manner responsive to the rate of inflation—this is the fully-hedged program—where possible losses on the deposit side are 'fully hedged' by similar gains on the other side." Brief at 17. Claim 36 does not require such balancing, and even if did, such is suggested by Mukherjee at page 50, last paragraph ("The initial idea had been to apply an extra charge to all loans equal to half the rise in the index, and then to use the funds to compensate all depositors for half their loss due to inflation.") and at page 67, first full paragraph ("All other banks operated on the principle of calculating an index surcharge on all loans at rates just sufficient to cover indexed payments to depositors.").

Appellant further asserts that "nowhere does Mukherjee teach o[r] suggest the combination of an inflation-adjusted deposit account with an inflation-adjusted loan account." Brief at 17. Apparently, appellant is asking us to construe the claim as limited to a combination of one inflation-adjusted deposit account and one inflation-adjusted loan account. This argument fails because claim 36 recites "at least one deposit account" and "at least one loan account" and, in any event, is an open-ended "comprising" claim.

For the foregoing reasons, we are affirming the rejection of claim 36. The rejection of dependent claims 37 and 39-44 based on Mukherjee in view of Musmanno is affirmed because those claims were not separately argued at pages 15-17 of the brief, which discuss this ground of rejection. 37 CFR § 1.192(c)(7) (2001).¹⁵

Summarizing, the rejection based on Mukherjee in view of Musmanno is affirmed with respect to all of the claims rejected on that ground, i.e., claims 24-26, 28-32, 34-37, and 39-44.

J. The merits of the rejection of claims 1-23, 31, 33, and 44 for obviousness over Mukherjee in view of Bodie and further in view of Musmanno

As did the examiner, we will begin by addressing claims 31 and 33, which depend on independent claim 24, and claim 44, which depends on claim 36. Final Action at 15-16, ¶¶ 25-27. The rejections of claims 24 and 36 based on Mukherjee in view of Musmanno have been affirmed for the reasons given above.

Claim 31 specifies that the principal component of the deposit account is "retired over a plurality of iteration periods in the account term by payments to the depositor in each iteration period."¹⁶ Because the payout is recited as being retired "over a plurality of iteration periods," the examiner is correct to conclude that this claim recites the payout characteristic of an annuity. Final Action at 15, ¶ 25. Appellant does not contend otherwise. For this payout feature, the examiner relies on Bodie, which is concerned with how to generate retirement income that is protected against inflation. Bodie, following a brief discussion (at 5, para. bridging cols. 1-2) of

¹⁵ Of these claims, claim 44 is also rejected on another ground, addressed *infra*.

¹⁶ This claim does not specify how the deposit accrual component is paid out.

the unsatisfactory performance of equity-based variable annuities (VA's) based on common stocks, explains that what is needed is a "purchasing power annuity (PPA)." After noting that PPA's in the form of inflation-indexed government bonds are available, Bodie's summarizes his own, alternate proposal for a PPA:

At first glance, the only asset that appears capable of providing a base for such an annuity would be default-free bonds linked to some index of the cost of living. Although proposals for the U.S. government or some other institution to issue such price-indexed bonds have abounded, there is no indication that anyone with the power and authority to implement any of these proposals is inclined to do so.

Given the apparent reluctance, it not outright opposition, on the part of government and private corporations to the issuance of price-indexed bonds, the relevant question is whether we can find any other asset, or combination of assets, currently existing in [begin page 6, first column] the U.S. financial system that could fulfill the same function. The empirical evidence developed below suggests that the most promising asset base for PPA's is short-term bonds hedged against unanticipated inflation with a small position in a well-diversified portfolio of commodity futures contracts.

Id. at 5, 2d col. through page 6, 1st col. (footnotes omitted). The examiner explains his reliance on Bodie as follows:

BODIE suggests a "purchasing power annuity" which is linked to the cost of living (page 5, col. 2). It would have been obvious . . . at the time of the invention to employ an index linked account as taught by MUKHERERJEE et al. and MUSAMANNO et al. in conjunction with an annuity payout in order to hedge retirement income against inflation, as suggested by the explicit balancing of index-linked deposits with index[-]linked obligations (page 50 of MUKH) using a ubiquitous and popular financial retirement savings and payout format: annuities.

Final Action at 15 (underlining omitted). The examiner's reliance on Bodie as disclosing "a 'purchasing power annuity' which is linked to the cost of living (page 5, col. 2)" makes it clear that he is relying on Bodie's discussion of the desirability of implementing PPA's as annuities in

the form of (unavailable) default-free government or corporate bonds linked to some index of the cost of living. Appellant is therefore incorrect (Brief at 17-20; Reply brief at 8) to treat the rejection as based on Bodie's proposed PPA's which rely on a combination of short-term bonds and commodity futures contracts, which PPA's are not mentioned in the part of Bodie cited by the examiner: page 6, second column. In fact, this error was pointed out by the examiner in responding to same argument in appellant's "Response to Office Action Dated July 25, 2001," at 9. The examiner stated: "[T]he part of BODIE relied upon is not the part Applicant has referenced. It would have been obvious to revert to the prior art. Although BODIE claims to have a better system by using futures, it recognized the prior-art." Final Action at 39, ¶ 68 (underlining omitted).

Appellant's interpretation of the rejection as based on Bodie's proposed PPA's appears to be based on Bodie's disclosure that inflation-indexed annuities in the form of default-free government or corporate bonds annuities did not exist:

Bodie then goes on to say that such things don't exist! So Bodie has no explanation or description whatsoever of the nature of this hypothetical index-linked bond, but concedes that in any event no such instrument exists. The author then states that the only solution to his desire to provide a PPA would be to base in [sic; it] on commodity futures contracts—an indicator or [sic; of] future expected inflation, not past inflation. Id. at page 6, col. 1.

Brief at 20. However, the fact that indexed annuities were not commercially available does not detract from Bodie's teaching of their desirability or preclude the examiner from relying on Bodie as a reference for that teaching. Sivaramakrishnan, 673 F.2d at 1384-85, 213 USPQ at 442. Nor does Bodie's observation that such annuities were not commercially available

amount to a "teaching away" from the use of such annuities. As explained in Syntex (U.S.A) LLC v. Apotex Inc., 407 F.3d 1371, 1380, 74 USPQ2d 1823, 1830 (Fed. Cir. 2005):

Under the proper legal standard, a reference will teach away when it suggests that the developments flowing from its disclosures are unlikely to produce the objective of the applicant's invention. In re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994). A statement that a particular combination is not a preferred embodiment does not teach away absent clear discouragement of that combination. In re Fulton, 391 F.3d at 1199-1200.

Regarding the examiner's motivation for combining the teachings of Bodie with those of Mukherjee as modified above in view of Musmanno, we agree that it would have been obvious for a bank to want to pay some or all of the costs of its inflation-indexed deposit accounts by investing in inflation-indexed annuities of the type described in Bodie, if and when they should become available, with the principal component of the annuity being paid out over a plurality of iterations over the term, as required by claim 31, and with the accrual component also being paid out over a plurality of iterations over the term (not required by claim 31). Appellant has not explained why claim 31 would be patentable over Mukherjee, Musmanno, and Bodie even if Bodie's disclosure of inflation-indexed annuities is considered to be enabling. We are therefore affirming the rejection of claim 31 based on those references.

Claim 33, which depends on claim 24, specifies that the "index" recited in that claim "corresponds generally to the consumer price index." The examiner has rejected this claim on the cited references in two different ways, both of which are persuasive. First, he argues that the claim is unpatentable over the combined teachings of Mukherjee and Musmanno in the manner discussed in the rejection of claim 24, asserting that Mukherjee discloses relying on the

"consumer price index" at page 51, third paragraph. Final Action at 15, ¶ 33. Since that page of Mukherjee mentions the "cost-of-living index" but not the "consumer price index," we assume that the examiner is equating the two terms, a conclusion which strikes us as correct one. As appellant does not contend otherwise or otherwise argue the merits of claim 33, we are affirming the rejection on this ground. The examiner alternatively relies on the teachings of Mukherjee, Musmanno, and Bodie as applied to claim 31 and further relies on Bodie's teaching (at 5, 2d col.) of basing a purchasing power annuity on "default-free bonds linked to some index of the cost of living," again apparently equating the cost-of-living index to the claimed "consumer price index" without challenge by appellant. The rejection of claim 33 is therefore also affirmed on this ground.

Claim 44, which depends on independent claim 36, calls for paying out the deposit principal component "by a schedule over the term" and also paying out the deposit accrual amount "by a schedule over the term." The examiner construes this claim as reciting the characteristic of an annuity, i.e., as requiring payout over a plurality of iteration periods, Final Action at 16, ¶ 27, an interpretation neither urged nor challenged by appellant. Nevertheless, we hold this interpretation to be unduly narrow because the phrase "by a schedule over the term" is broad enough to read on a single, lump sum payment at the end of the term, which is not how an annuity is paid out. This broader construction is consistent with column 3, lines 44-45 of the '461 patent ("terms may be scheduled to include only a single iteration") and also from a comparison of claim 1 ("means for paying the deposit principal component according to a second schedule over the term") with dependent claim 4 ("wherein the deposit principle payment means

comprises means for making a lump sum payment at the end of the term”). As a result, the examiner’s reliance on Bodie’s teaching of an annuity is superfluous and we are affirming the rejection for obviousness over Mukherjee and Musmanno for the reasons given above in the discussion of parent claim 36, to which we add our observation that the payout provisions of claim 44 are broad enough to be satisfied no matter how principal and accrual components are paid out. Assuming, on the other hand, the examiner is correct to construe claim 44 as reciting an annuity, the rejection is affirmed for the same reasons that we have affirmed the rejection of claim 31 for obviousness over Mukherjee, Bodie, and Musmanno.

Independent claim 1 is similar to independent claim 24 to the extent claim 1 recites (a) means for establishing data representative of a deposit account having a deposit principal component and a deposit accrual component comprising a fixed interest component and a variable interest component, (b) means for determining the rate of inflation, (c) an account management data processor for servicing the deposit account over its term, and (d) means for adjusting the amount in the deposit accrual component in response to the rate of inflation. Thus, claim 1 to this extent is unpatentable over Mukherjee in view of Musmanno for the reasons given above in the discussion of claim 24.

The other limitations of claim 1 have also been addressed in connection with other claims. Specifically, claim 1 differs from claim 24 by further reciting “means for retiring the fixed interest component by a first schedule over the term” and “means for paying the deposit principal component according to a second schedule over the term.” For the reasons give above in the discussion of claim 44, the examiner is incorrect to construe this language as reciting an

annuity, i.e., payments over a plurality of iteration periods. The examiner's reliance on Bodie's annuities is therefore superfluous and the rejection of claim 1 is affirmed for the same reasons as is the rejection of claim 24 over Mukherjee in view of Musmanno, since the payout provisions of claim 1 are broad enough to be satisfied no matter how the principal and fixed interest components are paid out. Alternatively, assuming the examiner is correct to construe claim 1 as reciting an annuity, the rejection is affirmed for the alternative reasons given for our affirmance of the rejection of claim 31.

Appellant does not specifically address any of dependent claims 2-23, instead simply incorporating by reference the arguments made with respect to other rejected claims. Brief at 18, 20. As those arguments are unpersuasive for the reasons given above, the rejection of claims 2-23 is also affirmed.

K. The rejection of claims 27 and 38 based on Mukherjee and Musmanno, further in view of Williamson

Appellant's only argument for the patentability of dependent claims 27 and 38 is that they depend on parent claims 25 and 37, respectively, which appellant contends are allowable over the cited prior art. Brief at 20. Because we have affirmed the rejections of claims 25 and 37, we are also affirming the rejection of claims 27 and 38.

L. Summary

All of the rejections have been affirmed with respect to all of the rejected claims.

M. Extensions of time

AFFIRMED

Allen MacDonald
ALLEN R. MacDONALD
Administrative Patent Judge

JCM/jcm

Appeal No. 2005-2642
Reexamination Control No. 90/005,841

cc:

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Austin, TX 78701

Enclosures:

(a) The American Heritage Dictionary of the English Language 373 (New College Edition, 1975).

(b) Santosh Mukherjee and Claire Orlans, Indexation in an Inflationary Economy – A Case Study of Finland, Vol. XL, Broadsheet No. 551, PEP The Social Science Institute, April 1975, at 50-73 and 106-11.

(c) <http://www.riskglossary.com/link/compounding.htm>.

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WILLIAM MORRIS, Editor

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dokos, beam

zen the outer
Latin, from
double. See

2. *Genetics*.
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dip-so-ma-ni-a (dip'so-mā'nē-ə, -mā'n'yə) *n*. An insatiable, often periodic craving for alcoholic liquors. [New Latin: Greek *dipsa*, thirst (see *dipsas*) + *-mania*.] —*dip'so-ma-ni-ac*, *dip'so-ma-ni-e-cal* (-mə-nī'kəl) *adj*. —*dip'so-ma-ni-so* *n*.
dip-stick (dip'stik) *n*. A graduated rod for measuring the depth or amount of liquid in a container, as of oil in a crankcase.
dip-ter-an (dip'tar-ən) *n*. Also *dip-ter-on* (-tə-rŏn). A dipterous insect. —*adj*. Of or belonging to the order Diptera; dipterous. [From New Latin *Diptera*, plural of *dipterus*, DIPTEROUS.]

dip-ter-ous (dip'tar-əs) *adj*. 1. Of, pertaining to, or belonging to the Diptera, a large order of insects which includes the true flies and mosquitoes, characterized by a single pair of membranous wings and a pair of club-shaped balancing organs called halteres. 2. *Botany*. Having two winglike parts: the *dipterous fruit of the maple*. [New Latin *dipterus*, from Greek *dipteros*, having two wings: *DI-* + *-PTEROS*.]

dip-tych (dip'tik) *n*. 1. An ancient writing tablet having two leaves hinged together. 2. A pair of painted or carved panels hinged together. [Late Latin *diptycha*, from Greek *diptykha*, from *diptychos*, double-folded: *DI-* + *ptykhē*, a fold, from *ptussein*, to fold (see *opt* in Appendix*.)]
dir. director.

Dir-ae (dī-rāk'), Paul Adrien Maurice. Born 1902. British theoretical physicist; a founder of quantum electrodynamics.
dire (dir) *adj*. *direr*, *direst*. Having dreadful or terrible consequences; calamitous; disastrous. See Synonyms at *sinister*. [Latin *dirus*, fearful, ill-omened. See *dwell* in Appendix*.]
—*dir'e-ly* *adv*. —*dir'e-ness* *n*.

di-rect (dī-rĕkt', dī-) *v*. *rected*, *recting*, *rects*. —*tr*. 1. To conduct the affairs of; manage; regulate. 2. To take charge of with authority; control. 3. To conduct (musicians) in a musical rehearsal or performance. 4. To move (something or someone) toward a goal; aim; point. 5. To give instructions to (someone) for finding a place. 6. To address to a destination. 7. To address to a person or audience. 8. a. To give guidance and instruction to (actors) in the rehearsal and performance of a play or the filming of a motion picture. b. To supervise the performance of actors in. —*intr*. 1. To give commands or directions. 2. To conduct a performance or rehearsal. —See Synonyms at *command*, *conduct*. —*adj*. 1. Proceeding or lying in a straight course or line; not deviating or swerving. 2. Straightforward; candid; frank. 3. Without intervening persons, conditions, or agencies; immediate. 4. By action of the voters, rather than through elected representatives or delegates. 5. Of unbroken descent; lineal. 6. Consisting of the exact words of the writer or speaker. 7. Absolute; total: *direct opposites*. 8. *Mathematics*. Varying in the same manner as another quantity; especially, increasing if another quantity increases or decreasing if it decreases. Compare *inverse*. 9. *Astronomy*. Designating a west-to-east motion of a planet in the same direction as the sun's movement among the stars. —*adv*. In a direct manner; straight; directly. See Usage note below. [Middle English *directen*, from Latin *dirigere* (past participle *directus*), to arrange in distinct lines, direct: *dis-*, apart + *regere*, to guide (see *reg-* in Appendix*.)]
Usage: *Direct* (adverb) and *directly* are interchangeable in the senses of in a direct line or manner, or straight (*went direct*, or *directly*; *to Atlanta*), and in the sense of without anyone or anything intervening (*direct*, or *directly*, *from manufacturer to buyer*). In all other senses of *directly*, listed at that word, the use of *direct* is not possible.

direct action. The use of strikes, demonstrations, and sabotage to achieve an end. —*direct actionist*.
di-rect-ac-tion (dī-rĕkt'āk-shən, dī-rĕkt'-) *adj*. Operating without intermediate ingredients, components, stages, or processes.
direct current. *Abb.* *dc*. An electric current flowing in one direction.

directed angle. An angle having an indicated positive sense.
directed distance. A segment of a line having an indicated positive sense.

di-rect-ion (dī-rĕkt'ŷən, dī-) *n*. 1. The act or function of directing. 2. Management, supervision, or guidance of some action or operation. 3. The art or action of musical or theatrical directing. 4. A word or phrase in a musical score indicating how a particular passage is to be played or sung. 5. *Usually plural*. An instruction or series of instructions for doing something. 6. An order or command; authoritative indication.

7. a. The distance-independent relationship between two points that specifies the angular position of either with respect to the other; the relationship by which the alignment or orientation of any position with respect to any other position is established. b. A position to which motion or another position is referred. c. A line leading to a place or point. d. The line or course along which a person or thing moves. 8. The statement, in degrees, of the angle measured between due north and a given line or course on a compass. 9. A course or area of development; tendency toward a particular end or goal. [Middle English, arrangement, management, from Old French, from Latin *directio*, from *dirigere*, to DIRECT.]

di-rect-ion-al (dī-rĕkt'ŷən-əl, dī-) *adj*. Of or pertaining to spatial direction, especially a single specified direction. —*di-rect-ion-āl-ty* *n*.

directional antenna. An antenna adapted for receiving signals from or sending signals in a particular direction.

directional signal. One of two flashing lights on an automobile that indicates the direction of a turn. Also called "directionals."

direction finder. A device for determining the source of a transmitted signal, consisting mainly of a radio receiver and a coiled rotating antenna. Often called "radio direction finder."

directional antenna. An antenna adapted for receiving signals from or sending signals in a particular direction.

directional signal. One of two flashing lights on an automobile that indicates the direction of a turn. Also called "directionals."

direction finder. A device for determining the source of a transmitted signal, consisting mainly of a radio receiver and a coiled rotating antenna. Often called "radio direction finder."

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direction indicator. A compass used in airplane navigation to compare an intended heading to the actual heading.

di-rect-ive (dī-rĕkt'iv, dī-) *n*. An order or instruction, especially one issued by a government or military unit. —*adj*. Serving to direct, indicate, or point out; directing.

di-rect-ly (dī-rĕkt'lē, dī-) *adv*. 1. In a direct line or manner; straight. See Usage note at *direct*. 2. Without anyone or anything intervening; immediately. See Usage note at *direct*. 3. Exactly; totally; absolutely. 4. At once; instantly. —See Synonyms at *immediately*. —*conj*. Chiefly British. As soon as: *We'll go directly he's ready*.

direct object. In English and some other languages, the word or words in a sentence designating the person or thing receiving the action of a transitive verb. The direct object in English is usually a noun, nominal clause or phrase, or pronoun and generally follows a verb. In *The boy broke the dish*, the direct object is *the dish*. See *object*.

Di-rec-toire (dē-rĕk'twār') *n*. The Directory (see). —*adj*. Of or in the style characteristic of the Directory period in France.

di-rec-tor (dī-rĕkt'ar, dī-) *n*. *Abb.* *dir.* 1. One who supervises, controls, or manages. 2. A member of a board of persons who control or govern the affairs of an institution or corporation.

3. a. One whose profession is the supervision and instruction of the actors in a dramatic production. b. The conductor of an orchestra or chorus. —*di-rec'tor-ship* *n*.

di-rec-tor-ate (dī-rĕkt'ar-ĭt, dī-) *n*. 1. The office or position of a director. 2. A board of directors.

di-rec-to-ri-al (dī-rĕkt'ar-ē-əl, -tŕ-ē-əl, dī-) *adj*. 1. Of or pertaining to a director or directorate. 2. Serving to direct; directive. —*di-rec'to-ri-al-ly* *adv*.

di-rec-to-ry (dī-rĕkt'ar-ē, dī-) *n*, *pl.* *-ries*. 1. One that directs. 2. A book listing names, addresses, and other data about a specific group of persons or organizations. 3. A book of rules or directions, especially for use in church worship. 4. A group or body of directors, directorate. —*adj*. Serving to direct.

Di-rec-to-ry (dī-rĕkt'ar-ē, dī-) *n*. The executive body in charge of the French government from 1795 to 1799. Also called "Directoire."

direct primary. A preliminary election in which a party's candidates for public office are nominated by popular vote.

di-rec-trass (dī-rĕkt'rĭs, dī-) *n*. A female director.

di-rec-trix (dī-rĕkt'rĭks, dī-) *n*, *pl.* *-trices* or *directrices* (dī-rĕkt'rĭtĕz). 1. *Geometry*. The fixed curve traversed by a generatrix in generating a conic or a cylinder. 2. *Military*. The median line in the trajectory of fire. [New Latin, "directress," from Late Latin *director*, DIRECTOR.]

direct tax. A tax, such as an income or property tax, levied directly on the taxpayer.

dire-ful (dīr'fəl) *adj*. Dreadful; frightful; dire. —*dir'e-ful-ly* *adv*. —*dir'e-ful-ness* *n*.

dirge (dĭrj) *n*. 1. A funeral hymn or lament. 2. *Ecclesiastical*. The office for the dead; a funeral service that is sung. [Middle English *dirige*, *derge*, from the first word in Medieval Latin *dirige, Domine, Deus meus, in conspectu tuo viam meam*, "Direct, O Lord, my God, my way in thy sight" (an antiphon in the office of the dead, adopted from Psalms 5:9). From Latin, singular imperative of *dirigere*, to DIRECT.] —*dirge-ful* *adj*.

dir-ham (dĭ-rām') *n*. The basic monetary unit of Morocco, equal to 100 francs. See table of exchange rates at currency. [Arabic *dirham*, from Greek *drachmē*, DRACHMA.]

dir-i-gi-ble (dīr'ə-jə-bəl, dī-rĭ'ə-bəl) *n*. An early steerable lighter-than-air craft. —*adj*. Able to be guided or steered. [From Latin *dirigere*, to guide, DIRECT.] —*dir'i-gi-bil'i-ty* *n*.

dir-i-ment (dīr'ə-mənt) *adj*. Rendering totally void; nullifying. Used especially in the phrase *diriment impediment of marriage* to signify any sufficient cause for voiding a marriage in the Roman Catholic Church. [From Latin *dirimens*, present participle of *dirimere*, to take apart, separate, interrupt: *dis-*, apart + *emere*, to take, buy (see *em-* in Appendix*.)]

dirk (dĭrk) *n*. A dagger. —*tr.v.* *dirked*, *dirking*, *dirks*. To stab with a dirk. [Earlier *durk*, *dork*, probably related to or altered from German *Dolch*, dagger. See *sheik* in Appendix*.]

dirn-dl (dĭrnd'l) *n*. 1. A full-skirted dress with a tight bodice, patterned after Tyrolean peasant wear. 2. A skirt of a similar cut. [German, short for *Dirndlkleid*: *Dirndl*, diminutive of *Dirne*, girl, from Old High German *thioma*, maid (see *tek-* in Appendix*) + *Kleid*, dress.]

dirt (dĭrt) *n*. 1. Earth or soil. 2. A filthy or soiling substance, such as mud, dust, or excrement. 3. Something mean, contemptible, or vile. 4. Obscene language. 5. Malicious or scandalous gossip. 6. Gravel, slag, or other material from which metal is extracted in mining. —*adj*. Made of dirt. [Middle English *drit*, variant of *drit*, excrement, mud, filth, from Old Norse *drit*, from Germanic *drit* (unattested).]

dirt-cheap (dĭrt'chēp') *adj*. Very cheap. —*dir't-cheap'* *adv*.

dirt farmer. *Informal*. A farmer who does all his own work.

dirty (dĭrti) *adj*. *-lor*, *-lest*. 1. Soiled, as with dirt; grimy; unclean. 2. Obscene or scatological. 3. Contemptibly contrary to honor or rules. 4. Of a clouded or muddy appearance. 5. Designating a nuclear weapon that produces an excessive amount of radioactive fallout. 6. Stormy; rough: *dirty weather*. —*v*. *dirtd*, *-ying*, *-ies*. —*tr*. To make soiled; stain; tarnish. —*intr*. To become dirty. [Middle English *drit*, *dirt*, from *drit*, DIRT.]

—*dir't-ly* *adv*. —*dir't-ness* *n*.

Synonyms: *dirty*, *filthy*, *foul*, *nasty*, *squalid*, *soiled*, *grimy*, *slovenly*, *slatternly*. These adjectives apply to what is unclean, impure, or unkempt. *Dirty*, the most general, describes anything physically unclean or offensive to propriety by being off-color. *Filthy* intensifies these senses, as does *foul*, which suggests

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dirk

diptych
Fourteenth-century Italian
ivorydirigible
Landing at Mineola,
New York, in July 1919

t tight/th thin, path/th this, bathe/b cut/dr urge/v valve/w with/y yes/z zebra, size/zh vision/s about, item, edible, gallop, circus/
à Fr. ami/œ Fr. feu, Ger. schön/ŭ Fr. tu, Ger. über/KH Ger. ich, Scot. loch/N Fr. bon. *Follows main vocabulary. †Of obscure origin.

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FOREWORD AND ACKNOWLEDGEMENTS

This publication is one of a series to come from PEP's study of inflation which is being undertaken with a grant from the Leverhulme Trust.

One of the authors of this broadsheet has been a member of the OECD's team of examiners appointed to conduct a review of Finland's manpower policies. In that context as well as more directly in relation to the preparation of this broadsheet many public servants, industrialists and trade union representatives have given information and comment with quite remarkable generosity. To all of them the authors are deeply indebted. A very special acknowledgement is due to Pauli Snellman, the International Secretary at the Ministry of Labour in Helsinki, who took great pains over arranging interviews for the second author with some extremely busy and knowledgeable people.

Helena Sledziewska typed and retyped drafts of this material and has helped with checking proofs.

PEP and the authors of this broadsheet are grateful to all these organisations and people for their help.

VI Finnish bank deposit accounts

The division of the Finnish banking system into commercial savings, co-operative and Post Office groups was described in Chapter IV. With an undeveloped stock market, a deposit account at one of these banks is often the only place a Finn can find to put his savings. Terms governing bank deposits are therefore an important influence on the savings of the household sector.

Five-year gestation

As the rapid inflation of 1950-1 was being checked by the stabilisation programme begun in October 1951, the banks took the decision, in principle, to adjust both their loans and deposits for inflation, on the basis of quarterly inspections of the cost-of-living index. The principle was examined by the joint body of Finnish financial institutions in 1950 at the initiative of the chairman (Rainer von Fieandt)* of the board of the large commercial bank Oy Pohjoismaiden Yhdyspankki (Ab Nordiska Föreningsbanken).

The banks claimed to be motivated by two desires: to promote economic justice and to protect the growth of their deposits. The new system was to come into being at the beginning of 1952, and a working party was set up by the joint standing committee of Finnish financial institutions to study the practical details. Finnish bankers are as cautious as any, and index-linked accounts were not launched until 3½ years later.

* The initial idea had been to apply an extra charge to all loans equal to half the rise in the index, and then to use the funds to compensate all depositors for half their loss due to inflation. What was eventually decided was different and more complex. Not all deposits were index-linked, but only specifically designated accounts carrying certain restrictions on withdrawal. Full inflation proofing was given to these designated accounts. The money needed to make them keep pace with the cost of living was found by imposing an 'index surcharge' on all loans. The amount of the surcharge was usually fixed according to the proportion of the bank's deposits benefiting by index adjustment, so that the bank could just balance its

* Mr von Fieandt later became Governor of the Bank of Finland, and was Prime Minister for five months in 1957-8. After this he represented Finland at the IMF and the IBRD.

commitments. (See Chapter IX.) This was of course less disadvantageous to borrowers than the initially envisaged scheme, so long as not more than half the funds on deposit were index-linked. In fact, it was only during a short-lived peak of popularity, in 1968, that index-linked accounts came anywhere near to half of all deposits. Until then a quarter had been the maximum. When these figures are considered it should be borne in mind that only a fraction of total deposits are genuine savings. One expert estimate is that 75-80 per cent of money banked is effectively on current account.

Deposit accounts

stem into commercial savings, as described in Chapter IV. With an account at one of these banks he put his savings. Terms governing the influence on the savings of the

being checked by the stabilisation banks took the decision, in principle, on the basis of quarterly inflation. The principle was examined by the Board of the large commercial bank (Suomen Säästöpankki).

Two desires: to promote economic growth and to protect deposits. The new system was set up in 1952, and a working party was set up to advise Finnish financial institutions to study the system as cautious as any, and index-linked deposits were introduced a few years later.

An extra charge to all loans equal to the cost of the funds to compensate for inflation. What was eventually decided was that all deposits were index-linked, but with certain restrictions on withdrawals to these designated accounts. The amount of the surcharge was found by the cost of living was found by the amount of the surcharge. The proportion of the bank's deposits that the bank could just balance

Birth and infancy

The first index-linked bank account was opened on 2 May 1955. This was a time when retail prices had been very steady for several years. While the authorities knew that this stability was fragile and that inflation could break loose again at any time, to the general public there can have seemed little point in the new arrangement offered by the banks.

The accounts were in four respects less favourable than ordinary deposit accounts. A lump sum of 30,000 markka (about 1972 £80) was required to open an index-linked account: such an initial deposit was not required for an ordinary account. Secondly, no withdrawals could be made for a full year from an index-linked account, whereas an ordinary deposit account could be closed within six months and 100,000 markka might be drawn from it each month. Thirdly, the interest on index-linked deposits was 1-1½ percentage points below that for normal deposits. Lastly, index-linked deposits did not share the privilege of tax exemption that ordinary savings enjoyed.

The mechanism of index compensation worked in the following way. Once the cost-of-living index (October 1951=100) had risen 2 points above 104, the capital was increased by as many full 2 per cents as the index had risen between deposit and withdrawal. The figures used were the averages (to the nearest whole number) of the index values for the three months before deposit and withdrawal respectively. The system did not work the other way: no reduction would take place if the index fell.

From May to the end of 1955 the facility remained available but practically unused. The first step of indexed compensation was only to be taken when the cost-of-living index reached 106. Throughout 1955 the index stayed safely in the neighbourhood of 100 (in fact, it was below 100 until August). During the first five months of their existence about 260 million markka (about 1972 £700,000) were placed in indexed accounts. While this was happening ordinary savings accounts grew by 8,700 million markka to 295,000 million markka—more than a thousand times the total of index-linked deposits. On 1 July 1955 index-linked accounts were made comparatively even less attractive by a ½ point rise in the interest rate on non-indexed deposits.

Index-tied accounts had been introduced simultaneously in all credit institutions except for one large savings bank, Helsingin Työväen Säästöpankki (now Suomen Työväen Säästöpankki). At first the commercial banks captured most of the funds on index-tied accounts, as was only natural in

Bank of Finland, and was Prime Minister of Finland at the IMF and the IBRD.

view of their dominance of the money market. But in December 1955 all commercial banks (but not the savings banks or cooperative societies) throughout Finland, and all types of bank in Greater Helsinki, stopped accepting new deposits on index-tied accounts. As the accounts opened earlier in commercial banks came of age and were closed down, the savings banks came to hold more than half of all index-tied deposits, even though they had only about 40 per cent of total deposits. The cooperative credit societies at this time had 40 per cent of index-tied funds, though a mere 20 per cent of total deposits.

At the beginning of 1956 a sudden burst of inflation caused index compensation to be paid out for the first time—the actual payments were made in June. During 1956, index-tied deposits received the same regular interest as did ordinary deposits. Depositors now started to show more interest in indexed accounts. The sum deposited grew steadily throughout 1956, and the commercial banks had second thoughts about rejecting this line of business. In January 1957 they offered indexed accounts again, and rapidly regained 30 per cent of the market. By then index-tied deposits were increasing at such a rate that, despite the commercial banks' incursion, the index-tied totals at the savings and cooperative banks continued to grow. By contrast the total of all bank deposits was at the time decreasing.

In January 1957 a choice of two kinds of index-tied account became available to the public. In addition to the old conditions of 100 per cent index compensation on a taxable (now called 'A') account, 'B' accounts were offered. These were tax free (like non-indexed deposit accounts) but gave only 50 per cent index compensation. 'B' accounts achieved instant popularity, and within a year of their introduction accounted for 44 per cent of all index-tied deposits. They were given a further boost early in 1958 when the banks gave customers the opportunity to avoid a proposed advance collection of income tax on 'A' index premia by switching their money from 'A' to 'B' accounts. In April 1958, 72 per cent of all index-tied deposits were held in the 'B' accounts.

September 1958 marked the peak of the first phase of popularity for index-tied bank accounts. They had passed one quarter of all deposits. By this time the bout of inflation that had made them attractive was over. A decline of the index-tied total set in. In January 1959, 'A' accounts were discontinued, and for the next five years practically all index-tied accounts were of the 'B' type, tax free but with only 50 per cent protection against inflation.

Rivals

Expansion of index-linked deposit accounts as a method of saving was much affected by competition from various alternatives at different times. Initially their growth was impeded by a strong sale of government bonds. The 5 per cent bond loan for public subscription of May 1955 promised full index compensation on the same terms as the indexed bank accounts that were introduced that month. The deposits received interest at $4\frac{1}{2}$ per cent. While $\frac{1}{2}$ per cent less interest might have appeared a fair price to pay for the

market. But in December 1955 all banks or cooperative societies bank in Greater Helsinki, stopped accounts. As the accounts opened and were closed down, the savings all index-tied deposits, even though al deposits. The cooperative credit of index-tied funds, though a mere

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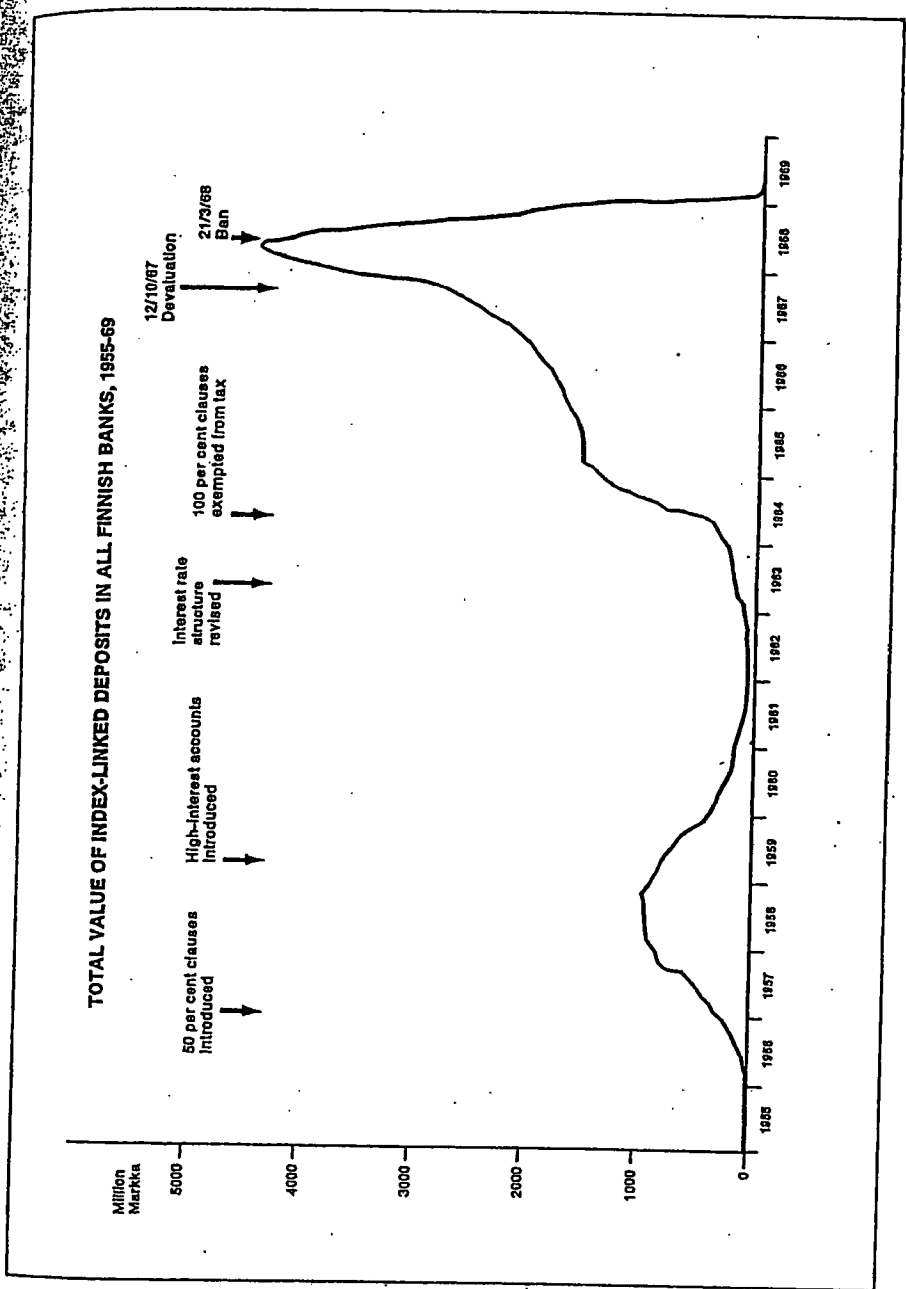


Fig. 4

greater liquidity of the bank deposits (a one-year rather than five-year maturity), against that the return on the government bonds was tax free. Ordinary savings at banks were exempt from tax on the grounds that the government wished to make up to the saver his loss through inflation. Logic required that interest on index-linked deposits, already inflation-proofed, should be liable for tax like any other income.

It did not escape the banks that this line of logic implied that the return on indexed government bonds should also be taxed. Discussions between the financial institutions and the government brought about agreement (at the end of 1956) on some changes. The interest margin between bank deposits and bonds was narrowed by half a percentage point. More significantly, deposits and government bonds were both to be subject to the same tax treatment. Returns on indexed assets were to be exempt from tax so long as the degree of linkage to the index was not greater than 50 per cent.

It is useful to consider the reasoning underlying the widespread use of a 50 per cent index clause by the Finns. At first glance it appears a half-hearted way to protect people from inflation. It is tempting to think that if there is to be an index clause at all it might as well do the job properly. Cynics have explained 50 per cent protection as the average of the rates put forward by keen advocates and outright opponents of indexing. Certainly it is in large part a product of compromise. But there is some economic justification. In the first place, it cuts down to a negligible size the risk of accelerating the inflationary spiral (see Appendix A). Secondly, it reduces fluctuations in the rate of return. The holder of a 50 per cent indexed asset has the equivalent of a ready-made investment portfolio, half in fixed-interest deposits and half fully indexed.

To take advantage of the parity of tax treatment agreed with the government at the end of 1956, the banks introduced a new type of indexed account. 'B' accounts had 50 per cent index clauses and, in accordance with the latest ruling, were tax free. But for protests from the savings banks, the commercial banks would have let these accounts take over entirely, cancelling the former 100 per cent inflation proofed but taxed type. The savings banks, however, insisted on keeping full protection for the small saver, who fared better under the old arrangement because of his low marginal tax rate. (The two types of indexed account in fact were available at the same time for a total of only five years out of the thirteen for which one or other existed.) Government bonds from this time on used index clauses only of the 50 per cent variety.

'A' and 'B' accounts at first carried the same basic rate of interest, 4½ per cent. In January 1957, when 'B' accounts started, the index clause for 'A' accounts was made more sensitive. Compensation was now to be paid for full 1 per cent changes in the cost-of-living index, instead of full 2 per cents. 'B' accounts received exactly half the index-related compensation rate paid on 'A' accounts. It was at this time that the commercial banks and institutions in Helsinki which had stopped accepting indexed deposits a year earlier came back into this business again.

Early in 1957 Finnish bank deposits received the highest gross nominal

t this line of logic implied that the tax should also be taxed. Discussion of the government brought about agreed changes. The interest margin between the indexed and non-indexed bonds was reduced by half a percentage point. Mortgage bonds were both to be subject to the tax and indexed assets were to be exempt. The tax on the mortgage interest was not greater than

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the same basic rate of interest, 4 1/2 percent. From the beginning of the 1970s, when the index clause for compensation was now to be paid on the basis of the cost-of-living index, instead of full 2 percent, the index-related compensation was reduced to half the time that the commercial banks and savings banks had accepted indexed deposits at the same time again. The savings banks received the highest gross nominal

Late in 1958 the pace of inflation slackened, and index-tied deposits began to fall off. From 1 January 1959 deposits were no longer accepted on 'A' accounts, which by this time had fallen to under a quarter of all indexed deposits. In the spring and early summer of 1959 the banks offered two new alternatives to indexed accounts. 'High-interest' accounts offered a steady 5 per cent (to be compared with the 3½ per cent current basic rate on indexed accounts). The period of deposit was 12 months, the same as for indexed accounts. The second kind, 'tax-concession' accounts, gave immunity from taxation to funds held in them for at least three years, with a maximum on the tax saving of 80,000 markka (about 1972 £150).

Earlier, index-linked accounts won against another potential rival. The stock exchange suffered a severe decline in 1956 because of the advent of a new type of real-value asset.

On 1 June 1963 a new interest rate agreement came into force. Its purpose was to further differentiate the interest rate structure on various types of deposits without altering the overall average rate. Among its provisions was an increase in the interest rate on high-interest accounts from 5 to 6 per cent. The rate on 50 per cent index-tied deposits was lowered from 4 to 3½ per cent. 100 per cent index-tied accounts, unavailable since 31 December 1958, were offered again, at 3 per cent interest; these remained subject to taxation.

At the beginning of 1963 index-tied deposits had already started to revive. In May 1964 they reached about six times the level at which they had stagnated in 1961-2. Then in a single month they leapt up by more than half. The reason for this was a piece of legislation which was later to be called 'the fatal flaw' in the Finnish system of index clauses. It freed all index-tied deposits from taxation. Holders of high-interest accounts and old-style indexed accounts of either 'A' or 'B' type were permitted to transfer their savings to new-style tax free 100 per cent indexed 'A' accounts. They did so rapidly, in large numbers.

This marked the beginning of a dramatic rise in the sum deposited on indexed accounts. Their total increased tenfold in four years; an average annual growth rate of 78 per cent. To some extent this can be explained in terms of the increasing rate of inflation, and people's growing awareness of their need of protection. The rate of increase of deposits certainly slackened in 1965-6 when inflation was less severe. But a fundamental change in the structure of the money market was in progress. Earlier there had been substantial tax concessions to encourage the building of private houses. These were being phased out, and capital that might have gone into new housing found its way instead into index-linked deposit accounts. Their new tax status had made them the most attractive financial asset in Finland.

'B' accounts suffered a death blow when 'A' accounts were freed from tax. The 1-1½ points extra interest which they offered enabled them to survive for another three years, but they tapered off completely at the end of that period.

The devaluation of October 1967 brought about the final explosion in index-linked deposits. Correctly expecting a sharp price rise, depositors shifted nearly all their long-term savings into index-linked accounts. 1,500 million Markka (about 1972 £200 million) flowed into these accounts in the space of six months.

Sudden death

In March 1968 a stabilisation agreement was signed by the central trade union and employer organisations. (See Appendix D.) Designed to quell the post-devaluation price surge, this traded wage restraint for price control. Among its provisions was the abolition of the system of index linkages for wages, rents, business contracts, bonds and bank deposits. The index clause was not to be applied to bank deposits after 30 November 1968.

Even more suddenly than they had sprung to prominence, index-linked deposits fell. A year later, all the money formerly in indexed accounts had left them. Most of it went straight to one of the high-interest accounts. New six and twenty-four month accounts offering 4½ per cent and 6 per cent interest respectively were available from 1 March 1969, as well as the old twelve month accounts which now gave 5 per cent. One outcome of the life and death of indexed bank deposits was that the share of long-term (at least one year) deposits in total deposits was much increased. Before the index-linked boom, at the end of 1963, this share had been 13 per cent; in February 1969 it reached 34 per cent.

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umatic rise in the sum deposited, and tenfold in four years; an average of some extent this can be explained by the people's growing awareness of the ease of deposits certainly slackened. But a fundamental change in the progress. Earlier there had been the building of private houses, capital that might have gone into new index-linked deposit accounts. Their new effective financial asset in Finland, when 'A' accounts were freed from which they offered enabled them to taper off completely at the end.

ought about the final explosion, following a sharp price rise, deposits into index-linked accounts. 150,000 (on) flowed into these accounts in

it was signed by the central bank (Appendix D.) Designed to quell the wage restraint for price control of the system of index linkages for bank deposits. The index clause after 30 November 1968.

sprung to prominence, index-linked formerly in indexed accounts had of the high-interest accounts. New offering 4½ per cent and 6 per cent on 1 March 1969, as well as the old 5 per cent. One outcome of the was that the share of long-term deposits was much increased. Before 1963, this share had been 13 per cent.

VII Bonds Issued by Finnish government or industry

Background of Indexation of bonds

For background to the substantial government index bond issues of the middle fifties one needs to go back to 1945. In that year indemnity bonds were given by the government to Karelians who migrated from the rather more than one-tenth of Finnish territory which had to be ceded to the Soviet Union.

Wherever possible, the Karelians' losses were made good in kind: farmers were given land, fishermen lakeside sites and house-owners building plots. Where individuals had lost stock and shares they were given similar holdings in large companies or state undertakings. Most small claims were settled in cash. Only when these ways of providing compensation were exhausted did the government resort to promissory notes or bonds; nevertheless a large part of compensation under the Second Indemnification Act had to be in this form.

During 1945-7 the average annual rise in Finland's cost-of-living index was over 43 per cent. In that context it was reasonable that bonds intended to compensate evacuees for their lost property should be inflation proofed. The method chosen was to increase the principal by 10 per cent for every 10 per cent rise in the domestic wholesale price index. During the ten-year repayment period, this index quadrupled; in consequence, some 61 thousand million markka were paid out in index-based compensation, on a debt whose nominal value was originally a mere 18 thousand million markka (about 1972 £12m.). Interest was paid at 4 per cent per annum on the current nominal value; thus, for every £10 of debt in 1944, by 1955 £29 capital and £5 interest had been handed over because of the index clause, as well as the original £10 and its £2 interest—in all £46.

Government bonds

In the late 1950s the Finnish government sold bonds of the order of 100 million markka (1972 £20m.) a year to the private sector; during the 1960s bond issues were higher, reaching a peak of over 600 million Markka in 1965 and 1966. Most issues were made for buyers such as insurance companies or banks and designed to suit their needs. Others were available for public subscription and thus stood in direct competition with bank deposit

Fig. 5

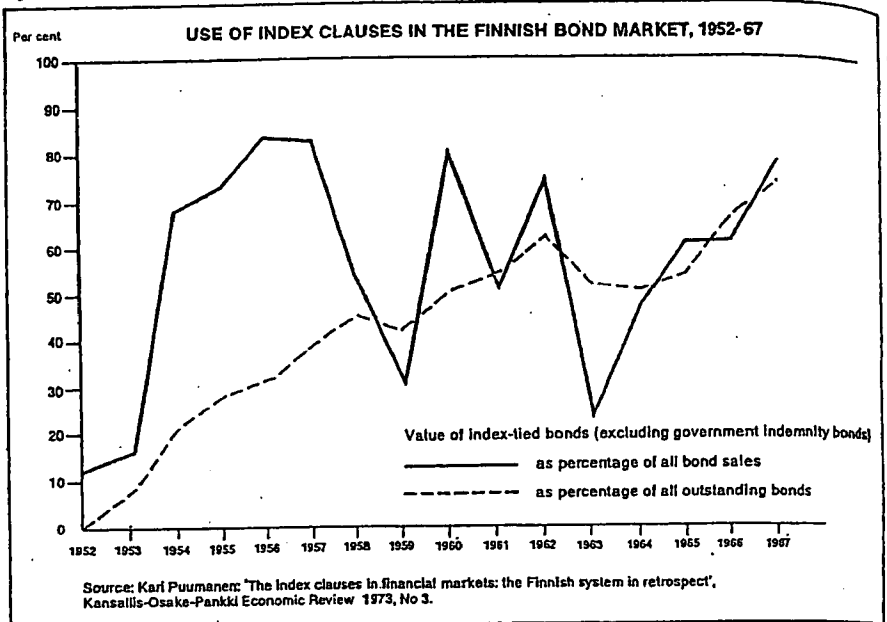
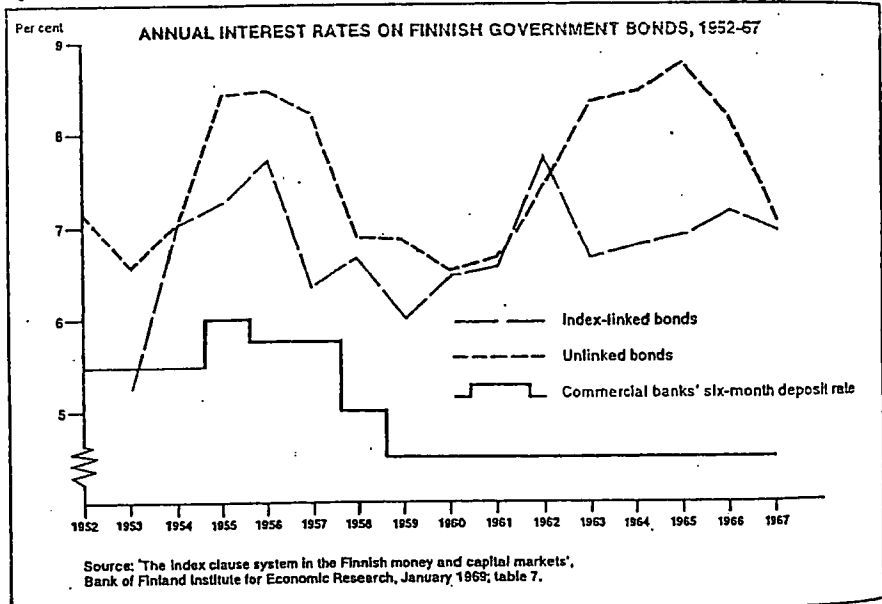
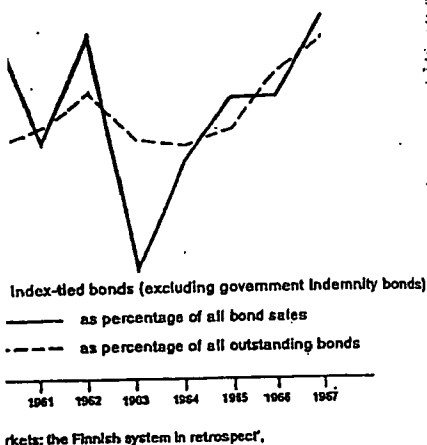


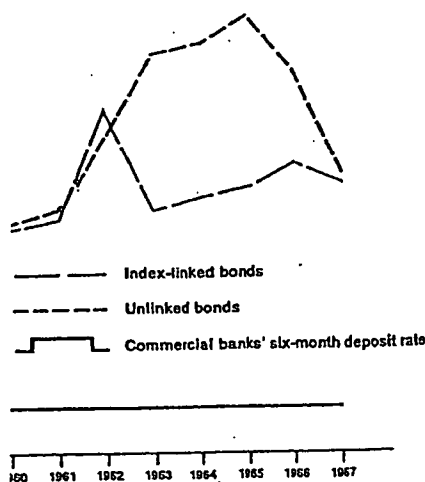
Fig. 6



FINNISH BOND MARKET, 1952-67



ISH GOVERNMENT BONDS, 1952-67



nd capital markets'.
y 1969; table 7.

accounts, the main repository of the Finns' relatively high level of personal savings. Local authorities and firms have also issued bonds, but central government bonds have dominated the long-term capital market throughout the period, and what government has done about index-linking of issues swamps the effect of similar moves by the others.

Institutional buyers had need of index-linked securities to enable them to meet their own index-linked obligations to the public. The demand from insurance companies, which had been operating index-linked policy schemes ever since 1948, was particularly steady. Banks and cooperative credit societies needed the income from index bonds to help pay compensation on indexed deposit accounts. Pension funds similarly had somehow to finance statutorily index-linked outgoings. The fact that the secondary market in bonds in Finland is very small, original buyers usually holding their bonds for ten or more years to maturity, increased the importance of including a value guarantee in these contracts.

In the month of September in 1953, 1954 and 1955, as the final payments on the index-tied second indemnity loan became due, new index-tied bond issues were made for its conversion. Each was paid off over a period of five years, and carried interest at 5 or 5½ per cent per annum. They were linked to the wholesale price index for Finnish goods, their value changing by as many full 5 per cents (up or down) as the index might have moved by the date of amortisation. The government safeguarded itself, however, against incurring a vast liability in the event of runaway inflation by making the index clause invalid once the index had doubled its starting value.

Between 1953 and 1968 the government made, on average, four or five major bond issues each year with an index clause. Throughout the period, sales of these bonds were a substantial proportion of total bond sales, though their market share fluctuated. It shot up from under 20 per cent in 1953 to over 80 per cent in 1956 and 1957. There was a drop to under 30 per cent in 1959, and a fresh peak of 80 per cent in 1960. A subsequent decline to just over 20 per cent in 1963 was followed by a rise again to 80 per cent in 1968, when all forms of indexation were abolished. The share of all outstanding bond loans carrying index clauses rose steadily over the period to reach more than three quarters.

Techniques of index linking

However, the 5 per cent bond of May 1955, issued for public subscription, was the only government bond (other than those associated with the Karelian indemnity issues) to carry a full index clause, in the sense that rises in the Index were to cause matched rises (per cent for per cent) in amortisation and interest payments. Recognition of the risk in promising full compensation led to the writing in of an upper limit of a 100 per cent rise in the index, as in the Karelian indemnity conversion loans. A threshold was built into the 1955 bond's index clause, and a delayed first step over the threshold: index-based premia were not incurred while the index was rising from 100 to 104, and then the first premium was not to be paid until 106 was reached, though later premia became due point by point. Repayment was to be by

five annual instalments, each of equal starting nominal value, and, because of the index link, of equal final real value. The index in question was the cost-of-living index. This was used in all major government index bond issues, with the single exception of the ten-year bonds sold to the National Pensions Institute in April 1963, which had a tie to the wholesale price index for Finnish goods. After the full index link of 1955, this form of inflation-proofing was abandoned in favour of one less attractive to the buyer but safer for the seller. The '50 per cent index clause' meant that a rise of 2 per cent in the index brought only a 1 per cent rise in amortisation and interest payments.

In addition to this return related to the cost-of-living index, ordinary interest was paid on these loans. In many cases the interest rate was fixed for the duration of the loan, a figure between 5 and 8 per cent per annum nearly always being chosen. Also popular with subscribers was a 'variable' interest rate, specified as a given number of percentage points (in practice, 1-3 points) above the current rate of interest offered on six-month deposits at the two largest commercial banks. One large five-year issue, made in four instalments in 1957 for the benefit of private credit institutions, earned interest at half a percentage point more than the current rate on index-linked bank deposits, indicating the sharpness at that time of competition for funds between government and the banks.

The importance of index linking in Finnish government bond issues in 1967-8 is shown by the eleven issues of winter 1967-8. Seven of these, together accounting for half of the total nominal value, carried index clauses. All of that indexation was of the 50 per cent cost-of-living type. The index-linked bonds were of ten, sixteen, or twenty-five year maturity. Non-indexed bonds had much shorter maturities—two or five years. Interest rates ranged from $6\frac{1}{2}$ to $7\frac{1}{2}$ per cent per annum for indexed bonds, and were 8 to $8\frac{1}{2}$ per cent for those without an index clause. Of five issues for subscription by banking institutions three had an index clause; the one issue for insurance companies was indexed. Of the other five (for public subscription) two were index-linked.

Earlier indexed issues of significance included a series of Forest Improvement Loans, whose proceeds were re-lent to forest owners for projects aimed at increasing wood production; this necessarily long-term enterprise was a natural candidate for inflation-proofing. The Labour Pension Funds for farming, lumbering and construction were also large buyers of indexed bonds. The list is completed by the various indexed issues intended for redemption of Tax Payment Certificates; these amounted to very large sums, and are a good illustration of the scope for integrity on the part of government in arranging its finances.

Assessment of benefits to investors

The Bank of Finland Institute for Economic Research has published weighted average annual interest rates on government bond issues with and without index ties, for each year from 1953 to 1967. For the whole of this period the yield spread between indexed and non-indexed bonds in the

starting nominal value, and, because of the low value. The index in question was the index of all major government index bonds sold to the National Bank of Finland. The National Bank had a tie to the wholesale price index (link of 1955, this form of inflation index was one less attractive to the buyer but the 'index clause' meant that a rise of 1 per cent in amortisation and

to the cost-of-living index, ordinary cases the interest rate was fixed between 5 and 8 per cent per annum. The interest rate with subscribers was a 'variable' number of percentage points (in practice, interest offered on six-month deposits). One large five-year issue, made in 1967, of private credit institutions, earned more than the current rate on index bonds. The attractiveness at that time of competition for index bonds.

Finnish government bond issues in the first half of winter 1967-8. Seven of these had a total nominal value, carried index of the 50 per cent cost-of-living type. The maturities were sixteen, or twenty-five year maturity, or two or five years. Interest was 5 per cent per annum for indexed bonds, and 4 per cent for non-indexed bonds. Of five issues for 1967, three had an index clause; the one for 1968 was indexed. Of the other five (for public

issues) included a series of Forest Improvement bonds, lent to forest owners for projects; this necessarily long-term enterprise was proofed. The Labour Pension Funds were also large buyers of indexed bonds. Various indexed issues intended for 1968; these amounted to very large issues. The scope for integrity on the part of

the Economic Research has published weights for government bond issues with and without index clause from 1953 to 1967. For the whole of the indexed and non-indexed bonds in the

Bank of Finland's table was much smaller than half the annual percentage change in the cost-of-living index. This means that those who were able to buy index-linked bonds did significantly better than those who did not. In part index-linked bondholders paid for this comparatively high return with the longer maturity of their bonds. But probably their gain must be explained mainly in terms of the Bank of Finland's conservative money market management policy.

Mortgage bank bonds

Next in importance to the government in the bond market come the mortgage banks. But their combined activity has on average amounted to no more than about a fifth of government bond issues. Finnish mortgage bank loans are confined to industrial and agricultural property; private house purchase is largely financed by government loans. Three institutions did most selling of bonds with index clauses: the Industrial Mortgage Bank of Finland (Suomen Teollisuus-Hypoteekkipankki Oy, STHPO); the Real Estate Bank of Finland (Suomen Kiinteistöpankki Oy, SKPO); and the Land and Industrial Real Estate Bank (Maa- ja Teollisuuskiinteistöpankki Oy, MTKPO). Each is wholly owned by one of the three non-governmental banking groups—STHPO by the commercial banks, SKPO by the savings banks and MTKPO by the cooperative credit societies.

The most striking difference in the terms of issue between these bonds and government bonds is the variety of indices which they used. While nearly all of the government issues were tied to the cost-of-living index, the mortgage banks linked their issues not only to that index but used the wholesale price index or its domestic subindex, or the export price index, or the official exchange rate for sterling as alternatives. All links were limited to half the change in the index. To compete with government bonds these issues had to offer comparatively high rates of interest, since the former had the privilege of exemption from tax. Repayment arrangements were similar to those for government bonds.

Industrial bonds

In each year between 1957 and 1967, private industrial concerns raised between three and thirty million Markka by means of index-linked bonds. From 1962 on, however, unlinked bonds became more prominent, and index-linking was not of such widespread importance in this sphere as it was in the world of mortgage and other finance. Industrial bonds tended to mature rather slowly, but also to have some added attraction, such as twice yearly payment of interest. Where a link was included it was more often with the wholesale price index than with the cost-of-living index. The indexation element was never so strong as to transmit half the change in the index; frequently a mere quarter was allowed.

Leading industrial index-bondmakers were in the wood manufacturing industry, engineering works and shipyards (Rauma-Repola Oy) and the Cooperative Wholesale Society. Others who joined in the process were the

Finnish Steamship Company, the Northern Power Company, a firm in sulphate, pulp and paper milling (Lohja-Kotka Oy), a manufacturer of oil products (Neste Oy) and the Central Organisation of Agricultural Cooperative Societies.

Local authority bonds

Though local authority bond issue has been small in volume, it deserves mention for two reasons. The City of Helsinki pioneered the way for index clauses in bonds with its 50 per cent cost-of-living link in 1952—a year before the first government index bond, and five years before non-financial companies were first authorised to issue index-tied bonds. In keeping with that pioneering past, practically all local authority bonds brought out in the subsequent fifteen years carried a similar clause. Besides Helsinki, the towns of Tampere, Porvoo, Turku, Loviisa and Vaasa all borrowed in this way at one time or another.

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VIII Social security, pensions and insurance in Finland

There is a long established Finnish tradition of maintaining the value of social security benefits and pensions, both in relation to earned incomes and against rising prices. A similar approach has also been taken towards protecting the worth of insurance policies. The method generally adopted for this purpose has been a link between these payments and an index of price changes. This arrangement for social security and pension benefits was thought to be so important that it was exempted from the scope of the 1968 legislation which prohibited most forms of index linking.

Social security benefits

Finland's old age, disability and widows' pensions are tied to the cost of living both in relation to the region where the person lives and in terms of the year to year changes in prices. The country is divided into three 'cost-of-living areas'. State pensions have tended to be about 18 per cent above those for the cheapest area in the intermediate cost-of-living zone, and about 35 per cent higher for the area with the highest rating on the index. The amount paid to the pensioner rises to provide full compensation as soon as the national cost-of-living index has risen by 3 per cent since the previous adjustment. This system has been in operation since 1957. Unemployment benefits and family allowances are also related to the local cost of living.

Other social benefits, for example income maintenance during sickness, have not had direct links with price indices. But being more closely and automatically related to earnings (sickness benefit is granted at a daily rate of 1/450 of the previous year's earnings), they have provided the recipient with greater protection against price increases than is available to his counterpart in Britain.

Occupational pensions

In addition to the basic state pension, all employees receive an occupational pension from their ex-employer. The 1962 legislation on occupational pensions requires them to be adjusted annually on the basis of the Ministry for Social Affairs' general *earnings* index. Self-employed people are covered by a compulsory old-age insurance scheme. Benefits from this scheme too

are adjusted in step with the general *earnings* index.

The fact that many occupational pensions are based on earnings late in life has meant very large increases for some pensioners. In early 1974 discussions were going on to establish whether these groups were being compensated too generously. An alternative solution being canvassed was a link with the index of rates of wages rather than the actual earnings index.

Life and accident insurance

Insurance companies in Finland were among the first to see the need for index-linking and to take practical steps in that direction. As early as 1948 they were issuing both risk and endowment policies with cost-of-living clauses. And they still continue to do so. Index-linking is not automatic but offered as an option with all policies. Not surprisingly, it has been taken up by the vast majority of applicants; in 1965 index-linked policies accounted for 99 per cent of all new insurance business.

A straight risk policy can be index-linked simply by index-linking the premia to be paid by the insured. Endowment policies are more complicated to index-link: the insurance company needs to find index-linked investments, in addition to asking the policy holder for an indexed premium. The insurance companies in Finland used much of their income to extend index-linked loans. Generally, a 50 per cent clause was applied for both the loans and insurance cover for the policy holder. Insurance companies were also natural subscribers to government index-linked bonds.

An example of an index clause of a type commonly used in insurance policies is shown on page 65. It stipulates 100 per cent linkage for the first three years (a period during which an individual policy's contribution to the firm's funds is quite small) and 50 per cent linkage thereafter. A contingency clause protects the insurance company against failure to make index-based adjustments. If, for instance, the insurance company is unable to make enough index-linked investments, the index clause in the policy is open to cancellation for the following years (in its application both to premia and to cover). With appropriate foresight, the index clause offered by insurance companies covered the issue of possible legislation to prevent index-linking of policies. In that event, all parties would under the terms of the clause be obliged to accept the rulings of the Ministry for Social Affairs on how to deal with the situation.

The Economic Special Powers Act of 1968 brought about precisely these difficulties. While insurance business was specifically exempted from the general ban on index-linking this was of limited help, for the index-linked investments which had made this kind of business possible were abolished. For a time the companies went on getting index-linked income from existing government bonds and these funds were credited to index-linked policies. By abolishing with profits policies and channelling all surplus funds to keeping up with inflation, the companies have managed to maintain some degree of index-linking.

One exception to the all-pervasive indexation until 1968 was the state

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pensions are based on earnings late in the 1970s for some pensioners. In early 1974 it was decided whether these groups were being covered by a new alternative solution being canvassed was based on wages rather than the actual earnings.

One of the first to see the need for steps in that direction. As early as 1948 endowment policies with cost-of-living index-linking is not automatic but has been taken. In 1965 index-linked policies accounted for a significant part of the business.

Index-linked simply by index-linking the endowment policies are more complicated. It is necessary to find index-linked investments, to find an indexed premium. The insurance company's income to extend index-linked policies was applied for both the loans and the insurance companies were also index-linked bonds.

Index-linking is a type commonly used in insurance policies. It calculates 100 per cent linkage for the first year of an individual policy's contribution to the premium, 50 per cent linkage thereafter. A company's guarantee against failure to make payments, the insurance company is unable to pay, the index clause in the policy is not applied for 1 year (in its application both to premium and to the index clause offered by insurance companies). The index clause offered by insurance companies is of possible legislation to prevent index-linking. The parties would under the terms of the index clause of the Ministry for Social Affairs on

The index clause of 1968 brought about precisely these changes. It was specifically exempted from the index clause of limited help, for the index-linked policies and of business possible were abolished. The index-linked income from existing policies were credited to index-linked policies. By channelling all surplus funds to keeping the index-linked policies managed to maintain some degree of

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The Index clause in Finnish life Insurance

Full Index clause

1 §. During the next three calendar years from the date of the policy the assurance cover (i.e. the sum assured and, if an additional insurance is attached to the policy the compensation consequently payable) and the premium are adjusted in conformity with the cost of living index in the following manner:

- (a) The adjustment is effected once a year, at 0 hours on the day when the first premium of the calendar year falls due for payment (= the adjustment time).
- (b) The basis of the adjustment is the October cost-of-living index (August 1938–July 1939 = 100). The October index of the calendar year immediately preceding the date of the policy is regarded as the basic index of the policy, and the October index of the calendar year immediately preceding the adjustment time is regarded as the index for adjustment.
- (c) Both the assurance cover and the premium will be, starting from the adjustment time, as many per cent of their basic amounts (i.e. the amounts without the index clause) as the index for adjustment is of the basic index. The percentage thus obtained is, however, rounded off to the nearest smaller whole number but is taken to be 100 were it less than 100.

Half Index clause

2 §. After three whole calendar years have elapsed from the date of the policy, when both the assurance cover and the premium were thus adjusted according to the third index for adjustment (= interim index) of the full index clause, the assurance cover and the premium are adjusted as prescribed under 1 § except that the index for adjustment will be taken as the average of the interim index and the October index of the calendar year immediately preceding the adjustment time. However, if the interim index is smaller than the basic index, the basic index and not the interim index will be used in calculating the average. Assurance cover and the premium are not reduced below the level that would be valid without the half index clause.

When the premiums are paid up, the adjustment time is 0 hours on January 1.

3 §. If the representatives of the policyholders find at a general meeting of the company that the company no longer holds index-tied loans or other comparable investment property on a scale sufficient for the half index clause in accordance with the principle of safeguarding the insured benefits under the Insurance Companies Act, the assurance cover and the premium will no longer during the following calendar years be increased according to the half index clause.

If because of legislation it proves necessary to abolish entirely or in part the index increases in the loans extended by the company, the question of whether and to what extent the increase in the assurance protection resulting from the half index clause is to be reduced in consequence will be worked out on the grounds laid down by the Ministry for Social Affairs. The index increases received by the company both from premiums and from index-tied loans must in this connection be credited to the policyholders.

Special stipulations

4 §. If the policyholder requests not later than a month prior to the adjustment time that the assurance protection and premium be no longer adjusted according to the index, the company will consent to it.

5 §. The methods employed in the application of the index clause will be approved by the Ministry for Social Affairs which will also settle any differences of opinion that may arise.

Source: Arvo Junnila: *Index Linkage of Life Assurance in Finland*, Helsinki, 1965.

insurance scheme against accidents at work. Instead of an index link providing automaticity, every two years a special Act of Parliament has been passed giving cost-of-living supplements to the previous levels of compensation. The scheme is employer financed, though state operated, and this unusual approach could owe something to the employers' organisations' wish to keep their contribution level and cost open to negotiation.

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IX Finland: loans with an index clause

The same methods of index linkage cannot always be applied to both saving and borrowing. Protection from inflation for savers is desirable on grounds of justice and in order to encourage investment. That outstanding debts should rise to match the reduction in the value of money may also be just, but such a system could powerfully discourage borrowing. Various ways have been tried in Finland to give savers maximum protection without imposing too heavy penalties on borrowers.

One way of going about getting some protection is the 50 per cent index clause, which the Finns have used extensively. Halving the extra amount that has to be paid out to creditors, because of the falling value of money, automatically halves the extra sums needing to be collected from the debtors. Another approach is to limit index linkage to a fraction—perhaps small—of the financial institutions' total liabilities. Indexed inflation proofing is clearly of the greatest importance for long-term transactions, and some long-term creditors will prefer fairly high fixed interest (rather than indexation) if offered the choice.

The National Pensions Institute of Finland started in 1946 to attach index clauses to some of the loans it made to businesses. They were linked to the domestic wholesale price index. Half of every loan was repayable in the ordinary way and the other half and interest and amortisation fully linked to the index. This, of course, is precisely equivalent to a 50 per cent index clause on the whole loan. In those early days there was an expectation that the price index could move downwards as well as up; consequently, adjustments of both capital and interest were permitted to occur in both directions. In actual fact, of course, there never was any downward adjustment. Though the Pensions Institute indexed only half of its lending operations it was able to pay fully indexed pensions, because the government made good the shortfall in its income.

Insurance companies also began, in 1948, to apply index linkage to their lending operations. Like the Pensions Institute, at first they too used a 50 per cent link with the domestic wholesale price index. Later the ordinary cost-of-living index became the more favoured link. Borrowers who ran into difficulties because of index generated rises in their obligations were allowed to extend their repayment period.

Banks started to make indexed charges on loans when their indexed

deposit business became of appreciable size. In the savings and cooperative bank sector this was in 1956. Similar charging arrangements by the commercial banks did not come into operation until rather more than a year after that. This part of the banking sector had interrupted this business for a year and initially were able to cover indexed payments to depositors with income from their holdings of government indexed bonds.

The Post Office Bank usually tied its loans 25 per cent to the cost-of-living index. All other banks operated on the principle of calculating an index surcharge on all loans at rates just sufficient to cover indexed payments to depositors. This meant, for example, that in a year when the index rose by 10 per cent, a bank with one fifth of its deposits in fully index-linked accounts would place an index surcharge of 2 per cent on all its outstanding loans. The surcharge became payable immediately by borrowers as additional interest; the outstanding debt was not, however, written up.

Bank pools

The proportion of index-linked deposits of course varied from bank to bank. To deal with that the cooperative banks established a pooling system to equalise the loan surcharges among themselves. The cooperative banks' central bank collected twice yearly from all members the proceeds of an index surcharge estimated so as to cover payments on indexed deposits in all cooperative banks taken together.

Initially, the savings banks had no comparable arrangement, each working out the necessary surcharge for itself. In some savings banks the proportion of indexed deposits was quite high, giving rise to a high index charge. In 1964 a pooling system similar to that of the cooperative banks was set up by the League of Finnish Savings Banks and their central bank. The operation began with three quarters of the savings banks as members of the pool. Between them they covered only 55 per cent of all savings bank lending: it was the larger banks in this group which chose not to join.

The other category of Finnish banks, the commercial banks, were all so large that their index surcharges worked out at the same level without any pooling arrangement. Each put its takings from index charges on borrowers in a special blocked account at the Bank of Finland. These balances yielded no interest and could only be used for making indexed payments to the commercial banks' depositors.

Government loans

Large-scale loans to industry were often tied 50 or 25 per cent to the whole-sale price or cost-of-living index. In 1958-9 loans were granted to industry from the proceeds of the post-devaluation export levy. These were tied 33½ per cent to the exchange rate for sterling.

Loans from the state to individuals generally were not index-linked. Pre-eminent in this category were the very cheap loans available for housing. State loans to students to finance university level studies too carried a low rate of interest and no index charge, unlike their counterparts in Sweden.

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of course varied from bank to bank. The banks established a pooling system for themselves. The cooperative banks pooled from all members the proceeds of interest payments on indexed deposits in

comparable arrangement, each working on some savings banks the proportion of the rise to a high index charge. In the cooperative banks was set up a group of banks and their central bank. The savings banks as members of the group only 55 per cent of all savings banks in the group which chose not to join.

The commercial banks, were all so tied out at the same level without any surpluses from index charges on borrowers in Finland. These balances yielded interest for making indexed payments to the

ties 50 or 25 per cent to the whole. 18-9 loans were granted to industry and export levy. These were tied to the index.

Generally were not index-linked. Pre-war cheap loans available for housing. University level studies too carried a low interest like their counterparts in Sweden.

Reaction of borrowers

The systems of index-linking loans practised by the banks resulted in very moderate surcharges. Only in 1967, when index deposits rocketed, did they reach 2 per cent. A more typical value was $\frac{1}{2}$ -1 per cent. During 1959-63, years of low inflation and few indexed deposits, no index surcharges were levied at all.

Borrowers naturally preferred a known rate of interest to an indefinitely variable future liability. But though they might have been reluctant at first to accept index linkage of loans, no drop in lending was recorded as a result of the extent of indexation practised by the Finnish banks and the government.

X Finnish commercial and property contracts

The index linkages discussed so far are those established and operated by the state or large and well-known institutions in the private sector. At times of rapid price increases (and in the absence of price control) business and industry practise, as far as they can, a simple form of inflation-proofing: they raise prices to cover costs. This can be seen as inexplicit index-linking, the implicit index being the particular industry's labour and materials costs. Explicit, formal indexation is only necessary when a market price is not available, or where for some reason the market price is inappropriate. Retirement pensions provide one example, and some interest rates another. Price control by the government can push most product prices into this category by making some cost increases 'non-allowable', as in Britain during part of 1973-4. In that sort of situation producers may be able to benefit by raising prices with reference to a suitable index. Use of an index could also be the best way of preventing haggling about price revisions for long-term contracts.

Indexing in business

Nobody knows precisely the extent to which Finnish businessmen used index-linking in contracts among themselves. But it is certain that the practice was widespread. When a general index was used it was usually the wholesale price index. Particular industries often took the subindex relating to their own products or just the wage earnings part of that subindex.

International agreements were exempted from the 1968 ban in Finland on index-linking. The United Nations Economic Commission for Europe publishes general conditions for the supply of plant and machinery for export. The price revision clause of the set of conditions (formulated in 1955) is given on pp. 71-2. It is an excellent example of the flexibility which can be obtained through a simple indexation formula. First the contracting parties agree on a division of the price into proportions corresponding to materials, labour and fixed costs. They agree on suitable published indices for measuring the variations in the prices of materials and labour. The final price is then calculated from the original by raising the material and labour price components by as much as the indices have risen. This sort of procedure was a widespread feature of Finnish business transactions up to 1968.

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Building contracts

Construction projects are particularly vulnerable to cost escalation during their often long lives. Builders cannot always sell at the tender price and stay solvent. Despite the 1968 prohibition, the most recent Finnish law on index-linking shows recognition of the special need for rules about price adjustment in this sector. It is now possible to link the selling price of buildings 66½ per cent to the materials and subcontracts subindex of the building cost index.

Before the 1968 prohibition, prices of buildings were commonly fully linked to the building cost index. This resulted in very healthy profits for builders, as they gained all the benefit from rising productivity—and those rises were rapid. The new arrangement reflects opinion about a more equitable distribution of cost increases between builder and buyer.

General conditions for the supply of plant and machinery for export

SUPPLEMENTARY CLAUSE

PRICE REVISION

Should any change occur in the cost of the relevant materials and/or wages during the period of execution of the contract, the agreed prices shall be subject to revision on the basis of the following formula:

$$P1 = \frac{P0}{100} (a + b \frac{M1}{M0} + c \frac{S1}{S0})$$

where:

- P1 = final price for invoicing
 - P0 = initial price of goods, as stipulated in the contract and as prevailing at the date of (1)
 - M1 = mean (2) of the prices (or price indices) for (type of materials concerned) over the period (3)
 - M0 = prices (or price indices) for the same materials at the date stipulated above for P0.
 - S1 = mean (2) of the wages (included social charges) or relevant indices (4) in respect of (specify categories of labour and social charges) over the period (3)
 - S0 = wages (including social charges) or relevant indices (4) in respect of the same categories at the date stipulated above for P0.
- a, b, c, represent the contractually agreed percentage of the individual elements of the initial price, which add up to 100.
(a + b + c = 100)

- a = fixed proportion =
- b = percentage proportion of materials =
- c = percentage proportion of wages (including social charges) =

Where necessary, b (and if need be, c) can be broken down into as many partial percentages (b1, b2, b3) as there are variables taken into account (b1 + b2 + bn = b).

DOCUMENTATION

For the purpose of determining the values of materials and wages, the parties agree to use the following documents as sources of reference:

1. Materials: prices (type of materials)
(or price indices)
published by
under the headings
2. Wages: wages (including related social charges)
(or relevant indices)
published by
under the headings (5)

Rules for applying the Clause. In the case of partial deliveries which are invoiced separately, the final price shall be calculated separately for each such delivery.

Period of application of the Clause. The revision clause shall cover the delivery period fixed in the contract, together with any extension thereof granted under Clause 7.2, but shall in no case apply after the date on which manufacture is completed.

Tolerances. Prices shall not be revised unless the application of the formula produces a plus or minus variation of (6)

Saving Clause. If the parties wish the revision formula to be adjusted or replaced by a more accurate method of calculation when the plus or minus variation exceeds a certain percentage, they shall expressly so agree.

- (1) It is recommended that the parties should, as far as possible, adopt as the initial price the price prevailing at the date of the contract and not at an earlier date. This is normally the contract price less cost of packing, transport and insurance.
- (2) Arithmetical or weighted.
- (3) Specify the datum period, which may be defined as part or the whole of the delivery period.
- (4) If legal social charges are covered by the index, they need not be taken into account again.
- (5) Indices relating specifically to the engineering and electrical industries should be used as far as possible.
- (6) State the percentage plus or minus variation which must be exceeded before the formula is applied.

Source: United Nations Economic Commission for Europe, 1955.

Leases and rents

It is generally advantageous for both parties to let land or buildings for a number of years at a time. Property owners are notorious for taking undeserved profits, and for this reason rents have in many countries been the object of statutory control. But rentiers' costs do rise. Indexing is one way of avoiding sudden large and possibly unwarranted increases in rents. It makes possible long-term leases even in the face of unknown future levels of inflation. In Finland land leases of fifty years or more have been allowed to include index clauses since June 1968, only two months after the ban. The law on indexing leases and rents has been further loosened since that time.

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It is again hard to know just how many private landlords used indexation. Public authorities have always kept their rents at minimum levels. Rents were often frozen, and then raised by the permissible maximum when controls came off. But some landlords certainly did use the cost-of-living index to regulate their rents.

2. Wage control:

(a) Wages may be raised in 1968 in accordance with the collective agreements in force or corresponding contracts, however, taking into consideration what has been agreed and decreed concerning the abolition of the index clause.

(b) Wages may be raised in the course of 1969 in accordance with the agreement entered into by the organisations. If there is failure to agree concerning wage provisions at the time the labour contracts or other pay agreements are made, the matter will be referred for decision to the Prices and Wages Council.

(c) The Prices and Wages Council will have a wage section in which central organisations are represented.

Appendix 2 Abolition of Index linkages under the Economic Emergency Powers Act

1. Acceptance of new index accounts by financial institutions has been discontinued and will not be re-introduced later. The index clauses of existing accounts will be applied until 30 November 1968, after which they will cease to be applied. Application of index clauses for credits granted by financial institutions or insurance companies, pension funds and other lenders will cease.

2. Financial institutions may collect an additional annual interest of 1 per cent at the most as long as a sum corresponding to the compensations payable on index deposits has accumulated in the index equalisation accounts controlled by the Bank of Finland.

3. The application of index clauses in rent contracts is prohibited. If rents were raised after 1 October 1967 because of an increase in the index increment payable on debts, the rents will be lowered to correspond to the relief effected in the loan costs.

4. Application of the index clauses in domestic contract work, delivery and merchandise delivery contracts is prohibited. However, the Prices and Wages Council may later permit an increase in these prices if it is necessary to avoid obviously unreasonable pricing.

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References and select bibliography

Apart from works referred to in the text, only publications of particular interest because of either their date or their content are included. Entries marked * contain further relevant references.

The list is arranged in sections as follows:

Theoretical, general and international

United Kingdom

United States

Finland

Brazil

France

Israel

Other countries

Theoretical, general and international

Tord Palander, *Värdebeständighet: ett problem vid sparande, livsförsäkringar och pensioner* [Stable value: a problem for holders of savings accounts, insurance policies and pensions], P. A. Norstedt & Söner Förlag, Stockholm, 1957.

Guy Arvidsson, 'Reflections on index loans', *Skandinaviska Banken Quarterly Review* 40, January 1959, pp. 1-14.

*Robert Eagly,

(a) 'An Interpretation of Palander's twin securities markets proposal', *Southern Economic Journal*, July 1960, pp. 51-4.

(b) 'On government issuance of an index bond', *Public Finance*, 1967, no. 3, pp. 268-84.

*Amotz Morag, 'For an inflation-proof economy', *American Economic Review*, 52, March 1962, pp. 177-185.

Peter Robson,

(a) 'Index-linked bonds', *Review of Economic Studies*, no. 75 (October 1960), pp. 57-68.

(b) 'Inflation-proof loans', *National Westminster Quarterly Review*, May 1974, pp. 48-60.

Pekka Ahtiala, 'Index-linked Debts', *Acta Universitatis Tamperensis Ser. A*, vol 10, Tampere 1967 (69pp.).

*Marshall Sarnat, 'Purchasing power risk, portfolio analysis, and the case for index-linked bonds', *Journal of Money, Credit and Banking*, August 1973, pp. 838-45.
Milton Friedman, 'Monetary Correction', *Institute of Economic Affairs Occasional Paper 41*, 1974.

J. Hein, 'A note on the use of index clauses abroad', *Journal of Finance*, 15 (December 1960), pp. 546-52.

B. I. Cohen, 'The use of indexed debts in underdeveloped countries', *Public Finance*, 1966, no. 4, pp. 449-457.

*'Index clauses in deferred payments', *UN Economic Bulletin for Latin America*, October 1957, pp. 73-89.

The Problem of Rising Prices, OEEC, Paris 1961.

David Finch, 'Purchasing power guarantees for deferred payments', *IMF Staff Papers*, February 1956, pp. 1-22.

OECD, Committee for Invisible Transactions, *Capital Markets Study Vol. II, Formation of savings*, Paris 1968, pp. 39-41, 97-105, 139-140, 176, 194.

OECD, Committee on Financial Markets, *Indexation of fixed-interest securities*, Paris 1974.

*Franklyn D. Holzman, 'Escalation and its use to mitigate the inequities of inflation', in *Inflation, growth and employment*, Commission on Money and Credit, Englewood Cliffs, 1964, (pp. 177-229).

*Elizabeth Liefmann-Kells, 'Index-based adjustments for social security benefits', *International Labour Review*, May 1959, pp. 487-510.

Emile Ecoffet, *Systems of compensation for cost of living increases in operation in the European PTT*, Postal, Telegraph and Telephone International, Geneva, December 1972.

*J. Geluck, *Wage indexation*, OECD Industrial Relations Division Conference on Wage Determination, July 1973.

Enzo Pontarollo, *The threshold in Europe: inflation, indexation and the trade union response in EEC countries*, Trade Union Research Unit, July 1974.

United Kingdom

Early controversy

W. Bagehot, 1875, 'A new standard of value', *Economist* (London), 20 November 1875. Reprinted in *Economic Journal* (London), vol. II (1892), pp. 472-77.

R. Giffen, 1892, 'Fancy monetary standards', *Economic Journal* (London) vol. II (1892), pp. 463-71.

A. Marshall, 1886, 'Reply to the Royal Commission on the Depression of Trade and Industry', reproduced in *Official papers by Alfred Marshall*, London, 1926, pp. 9-12.

A. Marshall, 1887, article in *Contemporary Review*, March 1887, reproduced in *Memorials of Alfred Marshall*, London, 1925, pp. 188-211.

A. Marshall, 1911, letter to Irving Fisher, reproduced in *Memorials of Alfred Marshall*, London, 1925, p. 476.

J. M. Keynes, 1927, 'Evidence presented to the Committee on National Debt and Taxation', in *Minutes of evidence* (Colwyn Committee), HMSO, 1927, Vol. I, p. 278 and p. 287.

Sir Otto Niemeyer, 1927, dismissal of Keynes' proposal in *Minutes of Evidence* (Colwyn Committee), HMSO, 1927, Vol. II, p. 633.

'Agenda for the age of inflation', *Economist*, 18 August-8 September 1951.

Official reports

Committee on the Working of the Monetary System (Radcliffe, August 1959), *Report*, Cmd 827; pp. 211-2; *Memoranda of evidence*, vol. 3, part XIII, no. 6, pp. 66-9; *Minutes of Evidence*, qq. 10043-141, pp. 663-4.

Committee
Report,
J. F. B. G
post-war I
1973, vol.
Cost of liv
Trades Un

Prices and
April 1962
July 1966
November
para. 40.
March 19
24, 26.
April 196
para. 41.

National
November
July 197
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overs
1973.
Inflat
Acco
stanc
and

portfolio analysis, and the case for indexation, August 1973, pp. 836-45.

Institute of Economic Affairs Occasional

abroad', *Journal of Finance*, 15 (Dec)

underdeveloped countries', *Public Finance*

Economic Bulletin for Latin America

11.

or deferred payments', *IMF Staff Papers*

Capital Markets Study Vol. II, *Formation*

140, 176, 194.

taxation of fixed-interest securities, Paris

to mitigate the inequities of inflation

on Money and Credit, Englewood

payments for social security benefits

7-510.

cost of living increases in operation in

phone International, Geneva, December

Relations Division Conference on Wage

flation, Indexation and the trade union

rch Unit, July 1974.

economist (London), 20 November 1875.

II (1892), pp. 472-77.

economic Journal (London) vol. II (1892)

mission on the Depression of Trade and

and Marshall, London, 1926, pp. 9-12.

Review, March 1887, reproduced in

1, 188-211.

duced in *Memorials of Alfred Marshall*,

the Committee on National Debt and

committee), HMSO, 1927, Vol. I, p. 278

es' proposal in *Minutes of Evidence*

33.

August-8 September 1951.

tem (Radcliffe, August 1959),

of evidence, vol. 3, part XIII, no. 6.

I, pp. 663-4.

Committee to Review National Savings (Page, June 1973);

Report, Cmnd 5273; pp. 190-8, 309-14.

J. F. B. Goodman and G. M. Thomson: 'Cost of living' indexation agreements in

post-war British collective bargaining', *British Journal of Industrial Relations*, July

1973, vol. XI, no. 2, pp. 181-210.

Cost of living threshold agreements: Report of a conference of trade union negotiators,

Trades Union Congress, 1972.

Prices and incomes policy white papers

April 1965, *Prices and incomes policy*, Cmnd 2639, paras. 12, 13.

July 1966, *Prices and incomes standstill*, Cmnd 3073, paras. 20, 21.

November 1966, *Prices and incomes standstill: period of severe restraint*, Cmnd 3150,

para. 40.

March 1967 *Prices and incomes policy after 30 June 1967*, Cmnd 3235, paras. 22,

24, 26.

April 1968, *Productivity, prices and incomes policy in 1968 and 1969*, Cmnd 3590,

para. 41.

National Board for Prices and Incomes reports

November 1965, *Salaries of Midland Bank Staff*, Cmnd 2839, para. 28.

July 1970 *Pay and other terms and conditions of employment of workers in the*

pottery industry, Cmnd 4411, paras. 48-50.

NEDO publications on price adjustment formulae

Formulae methods of price adjustment on building contracts, January 1969.

Recommendations for formula price adjustment on building contracts, October 1973.

Recommendations for formulae price adjustment for specialist engineering installa-

tions in building contracts, October 1973.

Price adjustment formulae for building contracts: A guide to the practical application

of the formulae, June 1974.

Description of the indices for use with the NEDO price adjustment formula for

building works, June 1974.

Report on price adjustment formulae for civil engineering contracts, May 1971.

Price adjustment formulae for civil engineering contracts—steelwork sub-formula,

November 1972.

Price adjustment formulae for civil engineering contracts:

1. *Civil engineering works (a guide to the practical implementation of the price*

adjustment formula), August 1973.

Inflation accounting

Inflation and company accounts: An interim report for discussion, Confederation of

British Industry, January 1973.

Exposure Draft No. 8, Institute of Chartered Accountants in England and Wales,

January 1973.

R. W. Scapens, *The treatment of inflation in the published accounts of companies in*

overseas countries, Institute of Chartered Accountants in England and Wales, August

1973.

Inflation and company accounts in mechanical engineering, NEDO, September 1973.

Accounting for changes in the purchasing power of money, Provisional statement of

standard accounting practice No. 7, Institute of Chartered Accountants in England

and Wales, May 1974.

United States

W. C. Fisher, 'The tabular standard in Massachusetts history', *Quarterly Journal of Economics*, Vol. 27, pp. 417-61 (1912-13).

Irving Fisher, *Appreciation and Interest*, Macmillan, New York, 1896.

Joint Committee on the Economic Report, *Monetary policy and the management of the public debt* (82nd Congress, 2nd Session, Washington 1952).

Milton Friedman and Fritz Machlup before the Patman Sub-committee; pp. 1105-6.

Replies of Treasury and Council of Economic Advisers, pp. 142-5, pp. 888-9.

Commission on Money and Credit, *Fiscal and debt management policies*, pp. 202-13.

James Tobin, 'An essay on principles of debt management' (Englewood Cliffs, 1963).

G. L. Bach and R. A. Musgrave, 'A stable purchasing power bond', *American Economic Review*, 31 (December 1941), pp. 823-5.

Richard Goode, 'A constant purchasing-power savings bond', *National Tax Journal*, IV, 1951, pp. 332-40.

Monthly Labor Review,

(a) Annual calendars of wage increases.

(b) Articles in no. 9, 1966 (pp. iii-iv: 'Prevalence of escalator clauses and experience with them in the past 20 years'), no. 6, 1972 (pp. 21-4: 'Cost-of-living escalation of pensions').

Finland

The index clause in the Finnish money and capital markets, Institute for Economic Research (Bank of Finland) Series D:2; revised version, 1969 (18pp.).

Arvo Junnila: *Index linkage of life assurance in Finland*, Helsinki, 1965 (22pp.).

Matti Ranki, 'Experience with index-tied bank accounts in Finland', *World Thrift*, 1965 (8pp.).

Numerous articles from:

Bank of Finland Monthly Bulletin, 1945-

Kansallis-Osake-Pankki Economic Review, 1950-

Insurance in Finland, 1960-

Authors include Tuure Junnila, V. J. Sukselainen, Kari Puumanen, Jussi Linnamo, Lauri Levämäki, Rainer von Fleandt, Arvo Junnila, Kari Karhunen, Keijo Liinamaa, Olavi Väyrynen.

Brazil

A correção monetária, Serviço de Publicações FIESP-CIESP, Cadernos Economicos no. 14, Sao Paulo 1973.

Inflation control and economic growth: the principles of 'monetary correction'. A Brazilian experience, Brazilian Embassy, London, June 1974.

A. Chalandon, *Rapport d'information sur l'économie brésilienne*, presented to the National Assembly in Paris on 18 December 1973.

Albert Fishlow, 'Indexing Brazilian Style: Inflation without Tears?', *Brookings Papers on Economic Activity*, no. 1, 1974, pp. 261-82.

France

Alek A. Rozental, 'Variable-return bonds—the French experience', *Journal of Finance*, December 1959, pp. 520-30.

Revue Economique, March 1955 (complete issue devoted to indexation).

P. Auberger, 'Le modèle brésilien de lutte contre l'inflation', *Documentation française*, December 1973.

Israel
A. Rubn
medium
pp. 69-7
Amotz
develop.
Praeger
Report
Jerusalem
H. Ben
devalua
'Approv
Review
Other a

Other
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Index I
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Scienc
Dieter
Nation

history', *Quarterly Journal*
 York, 1898.
 y and the management of
 52).
 committee; pp. 1105-6.
 142-5, pp. 888-9.
 gement policies, pp. 202-
 nt' (Englewood Cliffs, 1963).
 or bond', *American Economic*
 bond', *National Tax Journal*

lator clauses and experience
 1-4: 'Cost-of-living escalation'
 kets, Institute for Economic
 369 (18pp.).
 elsinki, 1965 (22pp.).
 Finland', *World Thrift*, 1965

Puumanen, Jussi Linna
 Karhunen, Keljo Linna

ESP, *Cadernos Economicos*
 of 'monetary correction'. A
 '4.
 ésilienne, presented to the
 Tears?', *Brookings Papers*

rience', *Journal of Finance*,
 to indexation).
 ', *Documentation française*,

Israel
 A. Rubner, 'The abdication of the Israeli pound as a standard of measurement for
 medium and long-term contracts', *Review of Economic Studies*, no. 75 (October 1960),
 pp. 69-75.
 Amotz Morag, 'Value linking of loans in Israel', in *Fiscal and monetary problems in*
developing states, Proceedings of the Third Rehovot Conference (ed. D. Krivine),
 Praeger, 1967, pp. 148-159.
 Report of the Public Commission on State Value-Tied Loans, Ministry of Finance,
 Jerusalem, January 1955.
 H. Ben Shahr and A. Zuckerman, 'Returns to proceeds of bonds and expectations of
 devaluation and price changes, 1958-67', *Bank of Israel Bulletin*, no. 32.
 Approved savings schemes, 1955-69', *Bank of Israel Research Department Economic*
Review, November 1970.
 Other articles in *Bank of Israel Bulletin*.

Other countries
 Betaenkning om vaerdifaste obligationer, Copenhagen 1956.
 Index loans, Swedish Ministry of Finance, Stockholm 1965.
 Willy Vandervondele, 'Les clauses d'indexation et leur licéité' (Belgium), *Revue des*
Sciences Economiques, nos. 174 ff., 1973.
 Dieter Bös, 'Index-linking of incomes and progressive taxation', *Zeitschrift für*
Nationalökonomie, vol. 34, nos. 1-2, 1974, p. 145.

Compounding

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When money is placed on deposit to earn interest, the interest can be paid out periodically as it is earned, or it can be left on deposit. If interest left on deposit does not itself earn interest, the deposit is said to earn **simple interest**.

Measure time in years. With simple interest, at any time t , the value of the deposit is given by the product

$$ar_s t \quad [1]$$

Where a is the amount of the initial deposit, and r_s is the simple rate of interest. For example, if

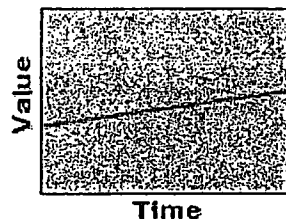
USD 100 is left on deposit to earn an $r_s = .06$ rate of simple interest, at the end three years, the deposit will be worth

$$100 (.06) (3) = 118 \quad [2]$$

Formula [1] means that, when a deposit earns simple interest, its value grows linearly with time.

Simple Interest

Exhibit 1



The value of a deposit earning simple interest grows linearly over time.

In practice, simple interest is rarely used for deposits held more than a year. An alternative is to credit interest, not based upon the initial value of the deposit, but based on its accumulated value. This

approach is called **compound interest**. With it, interest is earned on both the initial deposit and on any interest that has already been earned but left on deposit—interest is earned on interest. At any time t , the value of the deposit is given by

$$a \left(1 + \frac{r_n}{n} \right)^{nt} \quad [3]$$

where n is the compounding frequency—the number of times per year that interest is credited. The constant r_n is the interest rate. Typical values for n include

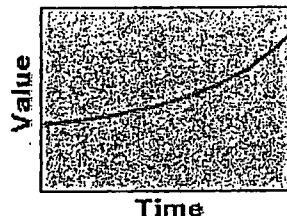
- 1 for **annual compounding**,
- 2 for **semiannual compounding**,
- 4 for **quarterly compounding**, and
- 12 for **monthly compounding**.

For example, if USD 100 is left on deposit to earn an $r_2 = .06$ rate of semiannually compounded interest, at the end three years, the deposit will be worth

$$100 \left(1 + \frac{.06}{2} \right)^{2(3)} = 119.41 \quad [4]$$

Formula [3] means that, when a deposit earns compound interest, its value grows exponentially with time.

Compound Interest Exhibit 2



The value of a deposit earning compound interest grows exponentially over time.

With compounding, larger values of n correspond to interest being credited more and more

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frequently. The limiting case of this is called **continuous compounding** where interest is credited on a continuous basis. The distinction is like the difference between getting water from a hand pump and getting water from a faucet. With the hand pump, the water flow is broken. With the faucet, it is continuous. The faucet does not necessarily deliver water any faster than the pump. It just delivers it continuously.

With continuous compounding, at any time t , the value of a deposit is given by

ae

where r_c is the continuously compounded interest rate and $e = 2.71828182845...$

For example, if USD 100 is left on deposit to earn an $r_c = .06$ rate of continuously compounded interest, at the end three years, the deposit will be worth

$$100e^{.06(3)} = 119.72 \quad [6]$$

Interest is rarely compounded continuously in practice. Continuous compounding is more of a theoretical notion. It is used frequently in theoretical finance because it simplifies many calculations.

Related Internal Links

- bond** Securitized debt.
- bond accrued interest** Interest that is earned but not yet paid on a bond.
- duration** and **convexity** Risk metrics employed in fixed income markets.
- fixed income term structure** Refers collectively to a spot curve, forward curve, discount curve, yield curve or any other curve that describes the time value of money at a particulate point in time.
- interest rate parity** An arbitrage condition that must hold between the spot interest rates of different currencies.
- interest rate spreads** Discusses credit spreads, liquidity spreads, optionality spreads, etc. in the fixed income markets.
- return** Any of a number of metrics for the change in an asset's or portfolio's accumulated value.
- yield** Any of several metrics of the income or return to be earned from an investment.
- zero-coupon bond** A bond that pays no coupons, pays its par value at maturity and is issued at a discount.

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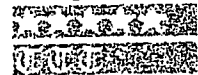
Related Books

Questa (1999) is an introductory text on fixed income and foreign exchange mathematics. Stigum and Robinson (1996) is a detailed, hands-on guide to fixed income computations with an emphasis on standard conventions for calculating day counts, accrued interest, compounding, etc.



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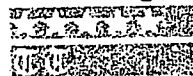
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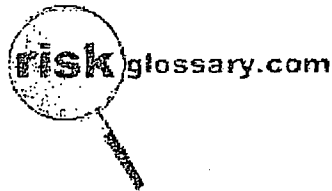
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